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FOR TEXTBOOKS

VOLUME XXIX NUMBER 4

Teachers College
RECORD

January, 1928

THE AIMS AND METHODS OF SCIENCE TEACHING IN THE SUCCESSIVE STAGES OF THE SECONDARY SCHOOL

By MATTHIAS J. W. PHILLIPS

Head of Science Department, West Allis High School, West Allis, Wisconsin

THIS paper by Mr. Phillips was awarded the Julius and Rosa Sachs Prize at the Annual Commencement of Columbia University, June, 1927. The Sachs Prize, the income of a fund of twenty thousand dollars, was founded by Dr. and Mrs. Julius Sachs in 1925 and is awarded to that person who, during a specified period, shall have prepared the best essay or treatise on a subject relating to the Promotion of Scholarly Efficiency in the Training of Secondary Teachers.—EDITOR.

THE aims of science teaching must be stated with reference to, and in terms of the natures, interests, and abilities of the pupils, and with reference to sound principles of teaching. That certain aims exist is not necessarily a proof of their justification. Actual human activities and needs should be examined in order to find out what science teaching should attempt to do. Aims must vary from place to place, from individual to individual, according to the equipment of the school, the character of the population, and its social condition. Since the ultimate aim of all teaching is "to adjust the individual to his environment, not only present but future and ideal," the teacher of science must make a survey of local conditions to realize this objective.

The methods employed by the science teacher in the secondary

school cannot be the methods of the college specialist. The principal difficulty in subject matter of the inexperienced but well-trained teacher is to adapt the material he is attempting to teach to the level of the group in his class. He finds difficulty in holding the interest of the pupil and, in this predicament, loses sight of any aim he has set out to accomplish. It is one thing to study the various methods of teaching in the courses offered in a professional school, but another to use these methods under the conditions found in the classroom in the school in which he is teaching. The methods employed should be those that will hold the child's interest and arouse his desire and curiosity for further investigation on his own account under the direction of teachers, parents, club leaders, and others who might be interested in his welfare.

The intellectual equipment needed by the teacher to carry out any aims by means of the use of modern methods will include thorough training in the whole field of science with some advanced work in at least one field. To understand the spirit of research one must have some experience in the field with research workers. If the teacher is not doing research work himself, he should at least become associated with investigators in order to get some conception of how new ideas originate in the human mind. With a knowledge of the field of science and how it is correlated, the teacher needs an understanding of the mental processes which make for the acquisition of knowledge, and a keen sensibility to the difficulties which present themselves to children in the learning process. The spirit of that which is new culled from current professional literature must be combined with a knowledge of how to apply discreetly some of these new ideas to the group he is teaching.

A discussion of the secondary school at this time must include the seventh and eighth grades which, with the ninth, have come to be the junior high school in the so-called "6–6" plan. Many schools are organized as six-year high schools; others are three-year schools with tenth, eleventh, and twelfth grades as the senior high school. In all probability the secondary school of the future will be recognized as a six-year school, with the division of junior and senior high schools in the larger and more congested districts. In this discussion I will consider the ninth grade as a part of the junior high school unit in so far as science teaching is concerned.

GENERAL AIMS IN SCIENCE TEACHING

The National Education Association Commission on the Reorganization of Secondary Education in its *Cardinal Principles of Secondary Education* has presented a statement of seven educational aims which should determine the work of the secondary school. This contribution includes the well-known "seven": (1) health, (2) command of fundamental processes, (3) worthy home membership, (4) vocation, (5) citizenship, (6) worthy use of leisure, (7) ethical character.[1]

Dr. Franklin Bobbitt, commenting upon these objectives, says in respect to the first one: "To aim at health, for example, in a vague, general way is scarcely to aim at all. We need an itemized statement of the specific habits which condition good health and which, therefore, are to be developed in men and women during their formative years; an itemized statement of the attitudes and valuations which lie back of and support these habits; equally specific statement of the definite powers of judgment to be developed; statement of the bodies of information needed for guidance, control, and the intellectual support of habits, valuations, etc.; statement of aspects of physical development in which the individual's pride should be awakened; and a number of other things."[2] In illustrating this first aim, Bobbitt gives a list of no less than thirty-eight specified health abilities at which the teacher in the educative process might aim. According to this authority, we might mention health as an aim, arrive at a single health ability, and miss thirty-seven others of equal importance.

Another means of selecting the aims in science teaching, according to Dr. W. W. Charters, is to analyze the activities of individuals. "The specialist in chemistry, for instance, constructs a course in that subject which presents the fundamental facts and principles of the science as the chemist uses them. The same material is taught to chemists, engineers, farmers, doctors, housekeepers, and laymen, with the expectation that each will apply such of it as he may need to the activities of his vocation or his leisure."[3] If the teacher should analyze the activities of the persons in the community in which he

[1] National Education Association Commission on the Reorganization of Secondary Education. *Cardinal Principles of Secondary Education*. U. S. Bureau of Education (1920), Bulletin No. 26.
[2] In *The School Review*, Vol. XXVIII, pp. 738-749 (Dec. 1920).
[3] In *Journal of Educational Research*, Vol. V, pp. 357-367 (May, 1922).

is teaching, and base the construction of his aims on these activities, the time remaining for the actual teaching would be almost negligible. However, a teacher attempting to do this, if in only a meager way, will gain some conception of what he is trying to accomplish.

The aim of pupils in studying science seems in general to be "to get credit for the course"; now and then an ambitious student wishes to prepare for "further work" or "advanced work." This latter aim, "to prepare for advanced work," or work which is to follow, seems to be the principal aim of many teachers. It is my opinion that the system of accrediting secondary schools by higher institutions, the Board of Regents Examinations, and the entrance examinations of higher institutions is largely responsible for this. The aim has been to go "on to school." Teachers have been measured by the caliber of the product they have produced for the higher institutions, not by the type of individual who is going out to face life. Each year the secondary schools show larger increases in enrollment and the higher institutions select only a few from the upper twenty-five per cent who have completed their secondary education. Because of this condition the secondary school must assume the responsibility of preparing its students for life rather than for college. The science of the secondary school will not be the preparatory school science, the policies of which are dictated by the college, but it will be the science of the activities and contacts of the future citizens of the community. It will be the science of the newspaper, of the popular scientific magazine, or that depicted on the motion picture screen or broadcast over the radio. It will deal with those activities which have enriched man during his leisure hours through experimenting, reading, observing,—not in the technical but in the popular sense. To function vitally, the science course of the secondary school must contribute to the future happiness of individual students in the present struggle for luxury. It must develop an appreciation of the inventor, the expert, and the opinions of others. It must, above all, show that logical conclusions from observed facts should take the place of haphazard observations or "signs" which lead to the popular superstitions.

Recapitulating, the aims of science teaching will generally include the "seven" of the Commission of the National Education Association plus the following: (8) to stimulate a spirit of investigation

and invention, (9) to organize knowledge so as to gain more knowledge, (10) to impart scientific information.

GENERAL SCIENCE—NINTH GRADE

The special aims for General Science for this grade should include the basic principles, personal hygiene and public sanitation, the value of reading science articles in newspapers and magazines, encouragement of experimentation and observations during leisure hours, stimulation through knowledge of lives of famous scientists, and exploration of the whole field of science. The material chosen to furnish the information for the child's use in realizing these aims must be selected without reference to what is to follow in his science course. After selection, the material should be arranged in units, practical for teaching. In the writer's opinion, based upon experience, the size of the unit studied should be small. Children have difficulty in relating materials in large units, and, consequently, find difficulty in seeing the result of one part in its relationship to the whole.

Methods of Teaching General Science in the Ninth Grade

1. Making the Assignment.
   - *a.* The unit should be the basis for the assignment.
   - *b.* The assignment should show the pages of the textbook and sections of the text containing related materials.
   - *c.* Lists of readings of popular character bearing upon unit.
   - *d.* Lists of home experiments bearing upon the unit, including experimental apparatus made by the pupil.
   - *e.* Local applications of principles involved in the unit with suggested visits to the place where these applications may be seen.
   - *f.* Questions suggested that pupils might ask of persons versed in these principles.
2. Motivation.
   - *a.* Demonstration in the hands of the teacher, assisted by some pupils.
   - *b.* Interesting preview of what may be learned in the assignment of unit.
   - *c.* Exhibition of some homemade apparatus made by other classes as possibilities of what can be done.
   - *d.* Suggestions added by the pupils.
3. Supervised or Directed Study.
   - *a.* Studying done by pupil in the classroom under direction of teacher.

b. Textbook materials and their use in preparation indicated by the teacher. Explanation of how to select and evaluate textbook matter.

c. Use of reference books and available supplementary material, the teacher helping the pupil who does not know how.

d. The use of current science materials, such as newspapers, magazines, popular science magazines, etc.

e. Study of directions for making apparatus, models, charts, etc.

4. Outside Activities.
   a. Visits to places of scientific interest pertinent to the topic.
   b. Making of simple apparatus to demonstrate principles before the class during recitation period.
   c. Reading of popular science books from a suggested list. This reading is for general interest only, not to be recited upon for credit.

5. Recitation.
   a. A socialized or, rather, a life situation of a pupil or group, presenting material or demonstration before the class. Topical recitation.
   b. Questioning of the group or pupil giving the demonstrations or report, by the pupils under the direction of the teacher, who is merely guiding from the background.
   c. Summarizing of those points brought out which bear upon the unit assigned.

6. Test.
   a. Pupils contribute questions of their own.
   b. Questions to be of the short answer type:[4] 1) True-false test; 2) judgment test; 3) completion test; 4) association test; 5) selection test.

7. Review of the points missed, and probably a second test.

The use of a test previous to the assignment is valuable in determining the individual abilities of the group and will aid the teacher in advising the pupil as to the character and amount of his work. Some provision must be made for individual capacities.

The procedure which the teacher is to follow in directing the activities of the pupils is illustrated by photographs of some of the units. (Figs. I, II, III.)

BIOLOGY—TENTH GRADE

The special aims for biology should be organized about the seven cardinal points of secondary education. These will include

[4] Russell, Charles. *Class Room Tests.* Ginn & Co.

FIG. I
HOW GAS IS MADE AND MEASURED

These pupils are demonstrating the operation of a gas meter. This is a Standard 3 Light Meter, cut open and fitted with glass sides and top, so all the working parts are in plain view. Note the "homemade" Bunsen burner (*The Science Classroom*, September, 1924). Eighth grade pupils are doing this work.

FIG. II
ELECTRO-MAGNET AND ITS APPLICATION

These boys are demonstrating the electric motor which they have made. Members of these classes made many ingenious applications of the electro-magnet, using nails, wire, corks, etc. Education can be made to take advantage of "play," and interest can be maintained at the "play level."

FIG. III

A collection of apparatus made by pupils during their leisure time. This material is superior to regular equipment for demonstration of fundamental principles. This illustration shows thermometer gas type, electric motors, Bunsen burners, models of pumps, compound microscope made from "Erector" parts. If some of the apparatus does not function, the pupil can do more work upon it, and under the direction of the teacher and of his parents, he can discover the reason for the difficulty. This worthwhile educative process replaces a "because-the-book-says-so" reason.

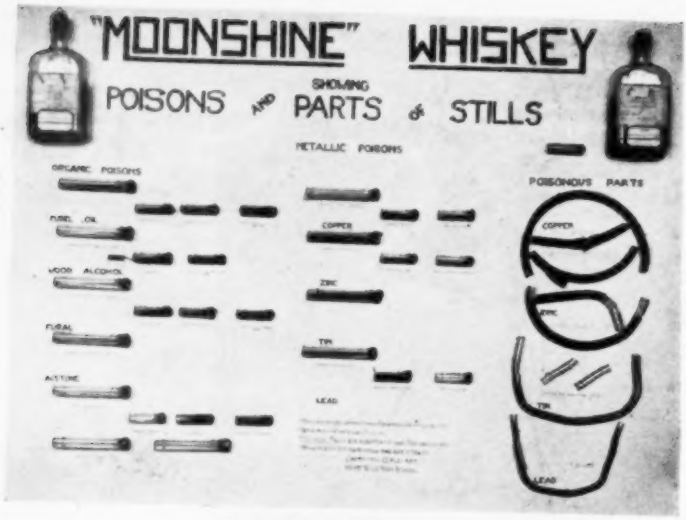

FIG. IV

This exhibit illustrates pupils' work with illicit liquor. The organic poisons and metallic poisons, together with portions of the condensing coils from actual illicit stills, and the source of metallic poisons are shown. Samples actually taken in police raids were used in this work. This project contributes to the aims of health and citizenship and arouses an unusual amount of interest. The chart is made on wall board, painted white, and lettered.

FIG. V

The boys devised various methods of showing the presence and kind of alcohol found in liquor. The material consulted was much greater than could have been expected of the pupil if he were asked to look it up. These boys looked it up because they needed material, and had a vital interest in getting it. The parents of the members of the class came to the school to see the work and to ask questions concerning the exhibits. Placing the student under conditions other than those of the classroom and having him recite to others under those conditions is a factor in education which is often neglected.

FIG. VI

CHEMICAL EXAMINATION OF MOTOR EXHAUST

Two boys selected this project to determine to what extent the presence of carbon monoxide is dangerous. One boy supplied a small motor wheel. A special fitting had to be made to the exhaust to take a portion of the gas through an "absorption train" containing various reagents to determine the qualitative character of the exhaust gases including carbon monoxide. The manipulation required considerable skill in planning and organization, attended by failures of operation, etc. The learning situation was the best the writer has experienced. The "purposeful" character of the activity was better than

health, command of fundamental processes, worthy home membership, vocation, citizenship, use of leisure time, and ethical character. Three forms of life, plant, animal and human, are taken up. Unity is attained by teaching the interrelations between life functions of plant and animal life. The knowledge obtained in this way is essential to an understanding of the life function of the human body.

The classroom technique is similar to that employed in the ninth grade General Science. Topical recitations and questions by class members are encouraged. Under this technique, laboratory work first makes its appearance during the *presentation* in the form of the lecture demonstration. The teacher is assisted by one or more pupils. Previews of units are often made more helpful and more interesting by the use of lecture demonstrations. During the directed study period, the pupil may do some so-called laboratory work whenever it is needed to help in the solution of a problem or to make some phase of the unit clearer. In no case is laboratory work segregated to certain days of the week. No laboratory experiment is assigned, as an experiment, to be done, written up in a *certain* form, and handed in by a certain date. It is done only if it is needed and at the time it is needed. This seems to be the only way to eliminate the "cook book," purposeless performing of experiments on the part of the pupil. He wants a real live reason for performing something, not going through so many motions of making drawings of meaningless structure, and making imaginary observations to put in the spaces of a notebook.

The unit is the basis for the assignment. Recitation, tests, outside activities, as hikes, trips to museums, the use of the camera, collecting methods, reading books on nature, etc., are encouraged, as in the case of General Science.

CHEMISTRY—ELEVENTH GRADE

The aims of a course in Chemistry will include an acquaintance with the elementary laws of nature; chemistry as it modifies the pupil's environment; illustrations of commercial processes and application of chemistry in industry, with a view to vocational guidance; an acquaintance with the lives and contributions of some chemists, development of broad concepts as the ultimate composition and indestructibility of matter to the end that science and reality may

function in place of uncertainty and superstition in explaining natural laws. The aims are in accordance with the views expressed by the Division of Chemical Education of the American Chemical Society and are based upon the "Seven Cardinal Principles" outlined at the beginning of this discussion.

Methods of Teaching Chemistry in the Eleventh Grade

On account of the time allotted for laboratory work, the procedure in high school chemistry will need some discussion as to changes that must take place in regard to the presentation of material. Many schools are now so organized that it is impossible to devote a ninety-minute period twice a week to laboratory exercises. The laboratory instruction must be given in a forty-five- to a sixty-minute period depending upon the school program. There is no difference in time between laboratory and recitation periods.

The crowded condition of the schools has increased the pupil load and decreased the time. The curriculum has been "jammed full" of electives and extra-curricular activities until there is no time left for this laboratory period.

College requirements, in most cases, still demand a double period. The writer has experimented with methods of instruction, and, contrary to popular belief, at least where the time has been limited to a single recitation period, there appears to be some evidence that the lecture demonstration in elementary chemistry is superior to the laboratory method.[5] Modified use of individual or group projects[6] to illustrate some process or other chemical phenomena is used to arouse interest in the subject and to develop certain powers of analysis and organization difficult to do in any other way. The pupil selects "his own" and with a spirit of creativeness[7] offers his contribution. Some of these projects are illustrated. (Figs. IV, V, VI, VII, VIII, IX.)

Reading a selected list of books on popular chemistry and visiting the chemical laboratories of plants preliminary to a discussion of

[5] F. G. Anibel. "Comparative Effectiveness of the Lecture-Demonstration and Individual Laboratory Method." *Journal of Educational Research*, Vol. XIII, No. 5, pp. 356-365 (May, 1926).
[6] Isabel Henkel. "A Method of Teaching Chemistry." *School Review*, Vol. XXXV, No. 8, pp. 591-598 (Oct. 1926). Also,
Chas. H. Stone. "A New High School Course in Chemistry." *Journal of Chemical Education*, pp. 233-238 (Dec. 1924).
[7] R. W. Brown. "The Creative Spirit and Art." *Harper's Monthly Magazine*, pp. 343-350 (Feb. 1925).

"chemical control" of industry are encouraged. The writing of the essay for the prize essay contest conducted by the American Chemical Society is required.

1. Assignment
   a. The unit is the basis for assignment. Considerable time is spent on making an assignment. Mimeographed copies of assignments are best to give to each pupil so he will know exactly what he is expected to do. The assignment may cover work for several days. In some units of work the time is much larger than others.

2. Lecture Demonstration
   a. The assignment is followed by a lecture demonstration which gives the pupil a rather interesting preview of what he is to study in the unit. Some stress is placed upon the application.

3. Supervised or Directed Study
   a. The pupil is shown how to use his textbook, references, other sources, and how to organize this material for his own use, not with the idea that he is expected to recite upon it in a formal manner in the classroom. He writes his laboratory directions during this time.

4. Laboratory Group Experiment before the Class
   a. The most effective method of performing the experiment is to have two or three pupils perform it before the other members of the class. Emphasis may be placed upon what the pupil is expected to learn. Before the pupil goes into the laboratory, he is expected to write out directions for the experiment he expects to perform. These are not to be copied out of a laboratory manual, but are to be the result of his study. His directions determine whether he understands what to do better than an interpretation of the results he gets from "ready made" directions. The notebook "writing up" is a waste of time for teacher and pupil. The teacher can utilize his time teaching the pupil how to study and use materials, and the pupil can use his time for study or something which is of interest to him.

   The short, simpler experiments are performed individually in the laboratory and sufficient practice is allowed the pupil to teach him to manipulate simple apparatus in chemical procedures.

5. Drill
   a. Some drill is required, especially with nomenclature, and the mechanical side of chemistry, the writing of formulas, symbols, equations for reactions, simple problems.

6. Recitation
   a. Topical
      1) A division belonging to the unit is undertaken. The pupil takes his place before the class. After he recites according to an outline, questions are asked by members of the class. In answering these questions bearing upon the topic, the pupil reciting will frequently perform some simple experiment, using materials to make the answer clear. The questions asked by the pupils indicate whether or not the class understands the material in the unit.

7. Test
   a. Short tests, using diagrams of apparatus used in experiments in unit. Questions requiring short answers, as the true-false, multiple-choice, and completion type. With these tests objective material can be covered in a very short time. Pupils can assist in making the tests by submitting questions of these types.

8. Review
   a. This is accomplished by written outlines handed to the class for out-of-class preparation.

9. Notebook
   a. Very simply written to include what the pupil expected to learn or his "object" and the conclusion, "what he learned." His manipulation was written when he prepared the directions to perform the experiment.

PHYSICS—TWELFTH GRADE

The objectives of a Physics course should include a study of the lives of the great leaders who were obliged to make great sacrifices to establish truths: to develop powers of interpretation from material facts; to encourage experimentation and observation during leisure time, and to illustrate, in a lasting manner through projects, some historic experiments or new conceptions in scientific discovery.

Methods of Teaching Physics in the Twelfth Grade

The unit forms a much more satisfactory basis for the conduct of the course than has the "ground-to-be-covered"—"lesson-to-be-learned" procedure. Sound teaching requires: first, the organization of the course which is to be taught; second, its organization in terms of present conditions in the school rather than in terms of ideal

FIG. VII

"Exhaust side" view of the motor exhaust project, showing the "absorption train" used to show the dangerous characteristics of carbon monoxide. Note that only a portion of the total exhaust gases is used. The remainder is being removed by the laboratory ventilating system. The amount is controlled by a small valve in the exhaust line.

FIG. VIII

Making lemon and orange flavoring extracts is the activity selected by the pupils. The essential oils of these fruits are extracted from the peel by steam distillation and then separated by means of a separatory funnel. The references required to get the results the pupil desired entailed a large amount of outside reading and planning. The success concomitant with this planning is the thing which helps to "fix" the subject in their minds.

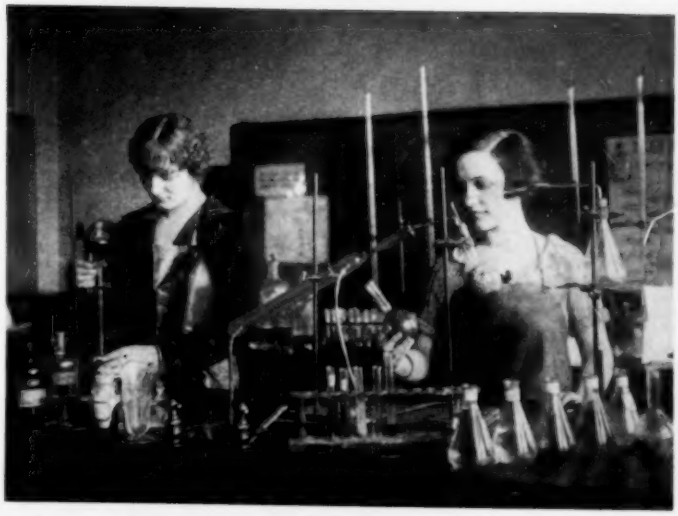

FIG. IX

This group is displaying materials in an electric furnace which it constructed. The power used by the furnace was supplied by the "step down" transformer from a motion picture projector connected to the power line. The girls in the picture are listening to an explanation of the way the furnace operates and the reactions which occur in it.

FIG. X

Grinding the mirror for a 10" reflecting telescope. The mirror is attached to the handle held by the boy at the left. The grinding tool is fastened to the board secured on the top of a barrel full of water. The boy at the right is putting on carborundum crystals and water.

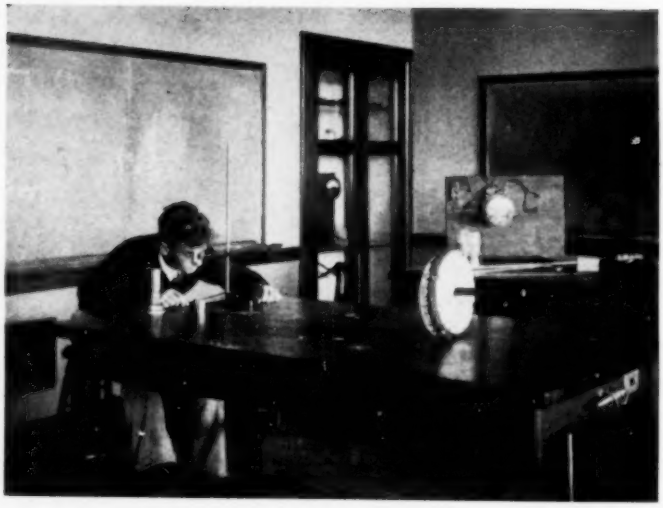

FIG. XI

Correcting the mirror with the Foucault Knife Test to determine the paraboloid figure at the center of the curvature. This is considered one of the most delicate tests in the realm of physics. It is done in a darkened room. The boy is viewing the cone of light from the mirror on the edge of the blade of a safety razor.

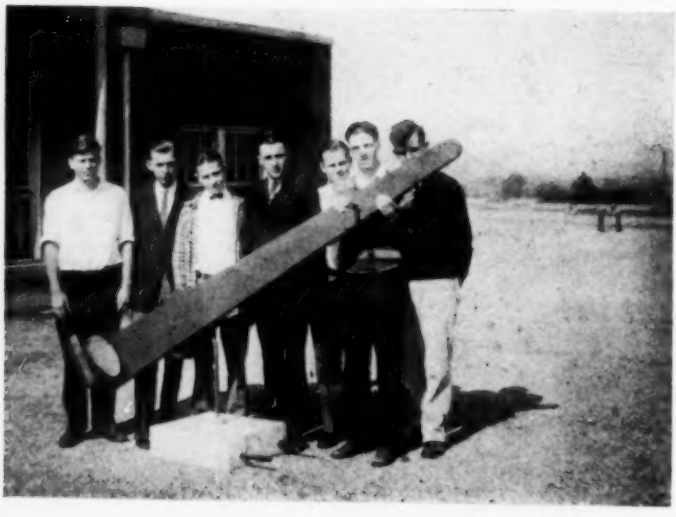

FIG. XII

The committee from the physics class who selected this project may forget nearly all else, but this activity will carry over. It may shape the lives of some of them. The writer gave two of these boys a letter of introduction to an astronomer at the Yerkes Observatory, Williams Bay, and they spent an entire Saturday with almost the freedom of that great institution. They were made to feel that their interests in this project were "real" interests and that they had contributed something worthwhile.

conditions; and third, selection of units in accordance with the materials available and the interests of the pupils to be taught.

The application of "diluted college" methods will not produce any better results. It will produce only those results which bring the criticism of the college professor upon the poorly taught product sent from the secondary school. The procedure must then assure the interest of the pupil.

Units, when decided upon, will contain the historic aspects of the science, the pure science, or the application taken from the environment of the child. A physics course could be built around the water meter, gas meter, electric meter, automobile, wireless set, telescope, etc., all of which can supply a part to the whole. Pupils trained to think through a project and to organize materials do better in advanced institutions than those trained by "lesson-to-be-learned" methods. The latter method permits very little "fixations" of principles beyond the examination and "credit-getting" stage. Nothing is carried over by the child to be used during his leisure as an adult. Leisure, and how to use it, is becoming one of the major problems of modern society.

The procedures are similar to those outlined in chemistry. The unit is the basis for the assignment, given with suggestions of sources of interesting material and places of scientific interest, together with application. This is followed by a lecture demonstration, which sometimes consists of the repetition of some historical experiment with emphasis on the time elapsing between its first performance during the leisure time of the discoverer, and subsequent thought bearing upon the same principle, contributed a generation or more later.

Supervised study makes it possible for the teacher to show the pupil how to use the tools of learning placed in his hands, such as books, references, and apparatus, or how to make observations which will assist in learning a principle. Means must be devised to create a demand for knowledge.

Individuals perform the simpler experiments in the laboratory to find quantitative relationships that exist in the material world. The pupil writes his directions for performing the experiment, and the conclusion of what he has learned. The recitation is topical and social. Tests are of the short answer type.

Group or individual projects are selected by the pupils according to their interests, in vacation or in any leisure time. Some may be short, requiring comparatively little work; others may cover quite a period of time, much of it to be spent outside school.

One project in the writer's experience involved building a ten-inch reflecting telescope as described by *The Scientific American*[8] and *Science and Invention*.[9] (Figs. X and XII.) The group which selected this learned a number of physical facts. While the glass disc was being polished, the mirror clung to the tool, and due to cohesion, it appeared impossible to get the two apart. The literature upon the subject did not explain how the boys could get out of the difficulty. (Fig. X.) Practical glass workers could not help them. Finally one of the group took his difficulty to a professor of physics at a near-by university. The professor suggested soaking the clinging discs in kerosene, and the application after several days of sidewise pressure by means of clamps, or a vise fitted with a special wood jig. His directions were followed and the discs came apart.

Correcting the mirror after grinding and polishing, by using the knife edge test (Fig. XI), presented a number of difficulties of the kind not encountered in a stock laboratory experiment. The physical principles learned in making a spherical mirror are far in excess of those learned by the pupil not making one. The motivating power of such a project is tremendous and there is little question but that it will carry over into the after-school days of the individuals who come in contact with the activity.

One cannot predict what pleasure any or all of these individuals will have during their leisure time in the years to come. Some might even enter the field of astronomy as amateurs or professionals. If they do not, ~~then~~ they will have developed a sympathy and an appreciation for the work of individuals in this field of science which is realizing one of our aims in secondary education.

EXTRA-CURRICULAR ACTIVITIES IN THE SCIENCE OF THE SECONDARY SCHOOL

The opportunity for free scientific discussion is not accorded the pupil under average classroom conditions. The science clubs realize

[8] Russell W. Porter and Others. *Amateur Telescope Making.* Scientific American Publishing Co., 1926.

[9] C. E. Barns. *Science and Invention,* Vol. 10, No. 8, pp. 758 (Dec. 1922); Vol. 10, No. 9, p. 872 (Jan. 1923).

some of the aims of teaching, especially with those enthusiastic students eager for leisure time projects. Successful science teaching uses the "gang spirit" of young folk to advantage in various clubs—the Camera, Model Aëro, Radio, Chemical Society, Poultry, Garden, and Nature Hiking Clubs being a few types of this activity. This work is successful only under the guidance of teachers who are enthusiastic about science, about teaching it, and about young folk.

The pupils themselves should give the talks and demonstrations in carrying on such activities. Projects in the science classes may be fostered by these clubs, and thus serve to maintain a live interest in science in the school. Three members of the Chemical Society in the writer's experience secured some liquid air and gave an auditorium demonstration before the entire school. The principal complimented them publicly for the excellent character of their performance. Secondary school students, given the opportunity, can do much more than adults think them capable of doing.

Individual differences in pupils, especially an interest in science, may be cared for by these extra-curricular activities, since those most interested in science may progress very rapidly under capable guidance.

The social aspect of the club is valuable in the training it gives in expression of views, differences of opinion, and the like.

Membership should be open to pupils of all high school grades. The writer has found the activities and influence of older pupils in this club work to be inspirational to the younger ones.

THE INTELLECTUAL EQUIPMENT OF THE SCIENCE TEACHER

To put into practice the aims stated in this discussion neither excellent personal equipment nor excellent academic equipment will guarantee success. Teaching power is both native and acquired and must be applied in order to attain success. Any person who is intelligent enough to teach can improve himself by developing practically all the desirable characteristics of superior teachers. The older teacher is superior to the younger teacher, provided the older one keeps abreast of the times in academic and professional matters.

The certification of teachers is based upon the academic, professional, and personal equipment of the candidate.

According to Davis: "The typical academic teacher of the North

Central accredited high schools is represented thus: . . . was educated in the public elementary schools, then spent four years in a public high school, graduated from the classical curriculum, spent four years either in a State University or a denominational or endowed university or college, where he pursued (among other studies) one major and two minor subjects. To both the major and the first minor subjects he devoted over 25 semester hours and to the second minor subject in excess of 10 semester hours.

"While in college this typical individual also pursued a teachers' course offered in the department of his major or minor interest, carried approximately 15 semester hours in the theoretical and practical courses in Education, had in the neighborhood of 20 supervised class observations of expert teaching in elementary or high school subjects, . . .

"This typical individual as he looks back over his work in Education in college has a very high regard for the courses in Principles or Methods of Teaching and for Educational Administration. For courses in the History of Education, Tests and Measurements, and Vocational and Industrial Education he has a mild contempt, accepting them but not being very enthusiastic about them. . . ." [10]

This discussion by Davis covers the mental equipment of the average science teacher, as well as his attitude toward some of the modern procedures in Education. The writer has taken the fifteen or twenty hours of Education necessary to get the proper certification, together with the other necessary majors and minors, but has found this training of little practical value in the classroom.

Davis continues: ". . . . this typical North Central teacher appears to believe that teacher's training schools may very wisely give more attention to courses dealing with Practice Teaching, Observation of superior teaching, and more practical Methods Courses. He also regrets that he did not secure a broader cultural education, did not delve more deeply in his field of specialization, and did not have more work relating to public speaking and community life." [11]

To be equipped to teach science successfully in the secondary school to-day, the teacher must have a wide training in Methods, Observation of Successful Teachers, and Educational Psychology. In addi-

[10] C. O. Davis. "The Training and Experience of North Central Association Teachers." *Proceedings of the North Central Association,* XXVII, Part I, pp. 24-54 (1922).
[11] *Ibid.*

tion to this training a view of the whole field of science, with some research in at least one branch to get the spirit of discovery, will aid the teacher materially in interesting the pupil in the classroom.

Reading some of the best books on the subject of teaching methods in science is invaluable. The following books will contain some methods which will enrich the teaching of any science by awakening a keener interest in the pupil. Lack of interest in a classroom should be the danger signal heeded by every science teacher. He should consult *himself,* supervisors, principals, and other teachers to find and to remove the cause of this lack of interest by changing the method.

DOWNING. *Teaching Science in the Schools.* University of Chicago Press.
EIKENBERRY. *Teaching of General Science.* University of Chicago Press.
FRANK. *How To Teach General Science.* P. Blakiston's Son and Co.
MANN. *Teaching of Physics.* Macmillan Co.
TRAFTON. *Teaching of Science.* Macmillan Co.
TWISS. *Teaching of Science.* Houghton Mifflin Co.
WOODHULL. *Teaching of Science.* Macmillan Co.
WOOLATT. *Laboratory Arts.* Longmans Green and Co.

Professional pride should be a part of the equipment of the teacher. He should belong to many associations of a professional character, such as the teachers' associations, local, state and national, and he should read some of the literature of each to get the viewpoint of the various units of the educational organizations. Membership will be valuable in such scientific organizations as the American Physical Society, the American Chemical Society, the American Institute of Radio Engineers, the Society of Mechanical Engineers, and the Society of Electrical Engineers. Attendance at the meetings of the local sections of the above organizations of which he may be a member is necessary.

By coming in contact with these specialists in the commercial field at these meetings, and then later in the plants where they are employed, the teacher acquires an excellent conception of the applications of the scientific principles he is attempting to teach. The teacher should visit all the manufacturing establishments in the vicinity of his school, so that he can become familiar with the principal activities of the population to the end that he can intelligently

organize the materials for the outside activities of the pupils in terms of their environment. This material will localize the background of the teacher and will necessarily vitalize his work and make it valuable in the lives of these young people.

The teacher should read widely from popular science books covering the whole field of Science. Books such as these are valuable in providing an adequate background.

BRISBANE. *Today and the Future Day.* Albertson and Co.
CALDWELL AND SLOSSON. *Science Remaking the World.* Harper and Brothers.
DARROW. *Boys Own Book of Invention.* Macmillan Co.
MILLS. *Letters of a Radio Engineer to His Son.* Harcourt Brace and Co.
MILLS. *Within the Atom.* Van Nostrand Co.
SLOANE. *Liquid Air.* Henley and Co.
SLOSSON. *Creative Chemistry.* Century Co.
SLOSSON. *Easy Lessons in Einstein.* Harcourt Brace and Co.
SLOSSON. *Chats on Science.* Century Co.
SLOSSON. *Keeping Up with Science.* Harcourt Brace and Co.

Books on the new types of classroom technique should be read to develop skill in making assignments and in supervising and directing study intelligently. Books on this list are helpful:

HALL-QUEST. *Supervised Study.* Macmillan Co.
MILLER. *Directing Study.* Scribner's Sons.
THOMAS. *Training for Effective Study.* Houghton Mifflin Co.

Careful planning, constructive thinking, and constant work will enable the instructor to teach his pupils how to study science effectively. He must determine by experimentation which of the new materials are effective and then make use of them. He cannot consider them impractical theories which some new authority has propounded. Valuable articles on the teaching methods of other instructors are found in the following professional magazines:

General Science Quarterly. Salem, Mass.
Journal of Chemical Education. Kodak Bldg., Rochester, N. Y.
School Science and Mathematics. Turton and Warner, Mount Morris, Ill.
Science Classroom. Popular Science Publishing Co., New York.
School Service Bulletin. Experimenter Publishing Co., New York.

Reading these magazines and selecting some material or method suggested in these publications, will help solve the difficulties in the

classroom. The science teacher who contends that he needs none of these aids, that he has no difficulty, and that he is satisfied with his work, certainly has a doubtful success. His only method is usually the "page-to-page-assignment," "lesson-to-be-learned," "teacher-question-pupil-answer" procedure which results in a classroom of listless pupils whose natural interest has been dulled by this procedure. No mental process is developed except memory and the "art of getting-by." Many science teachers as well as science pupils have developed this "art."

There should be a general reading of popular science magazines to keep the background up to date, and to teach pupils how to employ the science of the newsstand. The following are suggested:

Nature Magazine. Washington, D. C.
Popular Astronomy. Northfield, Minn.
Popular Science Monthly. New York City.
Science. Garrison, N. Y.
Science & Invention. New York City.
Science News Letter. Washington, D. C.
Scientific American. New York City.

The teacher should have a knowledge of the materials used as visual aids. A general knowledge of photography is valuable. With a little practice he can make his own lantern slides, and can accumulate complete sets of slides to illustrate various units in his work. He should understand the manipulation of motion pictures, which is becoming a factor in science teaching. Knowledge of the use of these materials can be obtained from reading such books as these:

ELLIS AND THORNBOROUGH. *Motion Pictures in Education.* Crowell Co.
FREEMAN. *Visual Education.* University of Chicago Press.

FURTHER CONSIDERATIONS AND CONCLUSIONS

The subject matter of science and the methods of teaching will in all probability require a change in order to realize the ultimate objective. Many of the forms and ideas used in the secondary school are "hand-me-downs" from the college, as, for example, the "time allotted" for a given piece of work, and the "ground-to-be-covered" in a certain way and in a given time. If these college entrance requirements are not completed satisfactorily, then the school faces the danger of being removed from the accredited list.

The reader will notice that I have carefully avoided any specified time element in this discussion. As soon as time is specified, the idea of "ground-to-be-covered" comes into play and individual differences and interests must be sacrificed and the educative process is impaired.

A single book on the subject of science without the conventional divisions of Physics, Chemistry, Biology, etc., written for the four years of the secondary school and studied through the four years will, in a measure, simplify the situation. Teach science as science thoroughly correlated with the environment of the child. The college may differentiate it into the special sciences to be handled by the specialist.

Methods must be changed to conform to the findings of the research workers in Education. There seems to be some evidence that such changes will be necessary. At least one investigator, August Dvorak,[13] while working in the field of science testing, found that some children actually knew less about science after studying it than before. He found that approximately forty percent of the boys actually suffered a loss as the result of instruction with standard materials and ordinary methods, at least in so far as the materials in the test he devised were concerned. A thorough examination of this field would show some interesting facts, if those facts which have appeared on the outer edge of the field of research are significant.

The method employed must hold the interest of the child. Interest is the basis for success in the thing a person undertakes to do. Without it, failure is certain. Some means of taking care of the imagination of the one studying science should be provided. The inventions of modern society are by-products of imagination and leisure. Science in the secondary school must satisfy a demand created by the increased leisure and imaginative power made possible by the twentieth century life. Work based upon interest and imagination leads to telling achievement. The only achievement the normal youth realizes in the average secondary school is the *mark* on his report card. He interprets his accomplishment in terms of this mark. The reorganized science curriculum must revise the

[13] Unpublished Doctorate Thesis, *A Study of Achievement and Subject Matter in General Science*, August Dvorak, 1923. Filed in the Library of the University of Minnesota, Minneapolis, Minnesota.

student's objective by basing itself upon interest, imagination, and achievement.

Ten years ago the writer witnessed a demonstration of the wireless telephone before a meeting of the Society of Electrical Engineers. The device, a complicated one, was manipulated by experts from the Signal Corps of the United States Army. During the last three or four years the boys in our junior high schools have used the terms employed by those engineers in that demonstration. Apparatus, as good and in some cases superior, is to be had from the counters of the popular five and ten cent store. When the results of that demonstration are compared with the wonderful music broadcast in the recent opening program of the National Broadcasting Company of America, we realize the tremendous development in radio in the lifetime of our youngest science students.

Twenty-five years ago the editorial writers of this country virtually crucified Langley by criticizing him severely for attempting a flying machine. Let us hope that educators will use science as a means of refuting this intolerant attitude by a tolerant one. The boy in our high school to-day stood beside his father a dozen years ago watching the airplane flight at the county fair or some similar exposition. If weather conditions were unfavorable, the flight was not made. To-day, the same lad watches the planes which day and night carry mail and express under all weather conditions.

About a year ago the writer listened to a lecture by that Arctic explorer, Donald B. McMillan, who stated that the airplane was not suitable for Arctic use. Less than eight months afterward came the announcement of the successful flight to the pole and back by one of McMillan's aides, Commander Byrd.

These are only two of the marvelous achievements of the last twenty years, or during the lifetime of our older science students. Isn't it reasonable, then, to conclude that these facts concerning the development of the applications of scientific achievement must be taken into consideration by the educators who shape the curricula and draw up the objectives of modern education? The demands of society must be met. Science teachers must adjust their methods to meet these demands. Education needs to be a preparation for life in a larger sense now than heretofore.

The chief aim of the instructor in the secondary school should

not be merely to prepare the pupil for college. It should rather be his aim to help him establish a basis for the accumulation of further knowledge at college or in whatever environment he may find himself. The college cannot hope to look upon secondary school as a preparatory school and expect to shape its policies to suit collegiate needs only. The aims, methods, teacher's intellectual equipment, will all be adjusted to meet the varying needs of education. The scheme must change, and the demands of modern society will effect this innovation.

AMERICAN EDUCATION AND DEMOCRACY*

By WILLIAM F. RUSSELL
Dean of Teachers College

OUR government Mercedes, the royal coat of arms proudly painted on its side, has ceased from its hurried journey over the roughly cobbled remains of Balkan military roads. With the help of a huge fence rail from a near-by field, three peasants are struggling to keep its weight off the axles, while our chauffeur calmly replaces a broken spring. Our delay is likely to last for some time. Here is our chance to look around.

The village looks old, weatherbeaten, and peaceful. On either side of the rutted streets are the clustered houses and outbuildings needed for the operation of the thousands of acres of adjacent farming land. One building is like another; one yard like the next. There are no outstanding buildings; apparently no poor section. The monotony of white stucco walls and orange tile roofs is broken only by the Greek church and the ruins of an ancient mosque.

Cool and rest are coming after the heat and labor of the day. The sun is setting. The wind has died down. Not a leaf rustles. But on all sides, approaching us nearer and nearer, come clouds of rising dust. It is the homeward rush of the peasants, the herdsmen and their flocks, a hundred geese, a score of cows, a yoke of oxen, a flock of sheep and goats, horses and dogs, men, women and children, a confused procession of man and beast as they ford the river and pour down the main street. But each member knows his own home, and order is soon restored. Then the smoke pours from the chimneys. The pungent odor of burning charcoal fills the air. Supper is prepared. And, as the children play about and the animals express their content, the elders parade up and down, and gather in groups for the evening tales and gossip. Twilight comes; our chaffeur calls; and we leave behind peace, quiet, and contentment.

* An address given October 27, 1927, at the Sixty-third Convocation of the University of the State of New York on which occasion the honorary degree of Doctor of Letters was conferred on Dean Emeritus James E. Russell.

But isn't it strange that the houses are so much the same? Why are there no evidences of unusual wealth? Can it be that all are equally poor? No, men vary here just as everywhere else, but they dare not show a difference. The taxgatherer comes. Tithes are collected. Indemnities are demanded. Food commandeered. Be he intemperate or sober, lazy or industrious, extravagant or saving, the peasant must not stand out from his fellows. Deep down in the earth, or hidden beneath the hearth or in the straw, lie the family treasures, the excess beyond the barest needs; for man may openly enjoy only a subsistence. Labor he must, but he may not enjoy the fruits of that labor. To the tax farmer and noble, to the rich and the royalty, he is a slave.

We are now guiding our bicycles over the sunken roads in northeast China. Above us, on either side, stretch out the fields. But we cannot see the millet and the tobacco. Our path is worn deep in the earth, five feet, six feet, seven feet, eight feet, from tens of centuries of passing hoofs and feet. Our village this time is a collection of earthen walls and roofs of thatch. Through the wattle fence we see an old, old woman and a little girl slowly circling an ancient stone mill, grinding the grain for the morrow. The men come in from the fields bearing their plows on their backs and driving an occasional diminutive ox or ass before them. The handful of leaves heats the evening meal. The children play about. Darkness comes on, and in a great circle the old men and women relax in an hour of talk and telling tales. Again we find quiet and peace and contentment.

Well may they enjoy this day. Foreign troops are distant. Robber bands are far away. But it is only a truce, an interlude. They know full well that their rest is uncertain and their security only apparent. At any moment, without warning, they may be out of house and home, scattered, starving, wounded, killed. They face life calmly, stoically, but with dread. What the future holds, no one knows. And to their idols and spirits, their demons and gods, they sacrifice and pray.

We now exchange our bicycle for an isvostchik, with runners instead of wheels, sliding, bumping, lurching over the harsh crunchy snow of central Siberia. Across the river, far below us, stretches out the gray city of Irkutsk, with here and there a Russian church thrust-

ing its gilded spire high in the air. At crossroads we pass wayside shrines, resembling an American bird house on a post. Far in the distance we see a solitary church, then a mass of gray houses, then a street, up which we drive to visit the object of our journey—a Russian village school. We enter the anteroom, with its row of children's hats and coats. We pass on into the schoolroom and at once feel at home. Three banks of seats—a desk for the teacher on a raised platform—a map of the world—a blackboard—the multiplication tables up to ten times ten. Over in the corner a big brass samovar bubbles away, with a tray of bread for the noon lunch. Beyond is an apartment where the teacher lives. Altogether it is a very pleasant little school. I ask:

"Is this the first grade?"

"Yes."

"And this the second?"

"Yes."

"And this the third?"

"Yes."

"Where is the fourth?"

"But these are peasant children."

I see that I am not understood.

"This is the first grade?"

"Assuredly."

"And these the second and third?"

"Certainly."

"And *where is the fourth grade?*"

"These are peasant children."

"But there is a fourth grade in Irkutsk?"

"Yes, but that is a high school. This is an elementary school."

"How old are you when you go to high school?"

"Eight years old."

"And how old are you when you go to elementary school?"

"Eight years old."

"But I thought you said eight years old for the high school."

"I did."

"But I thought you said eight years old for the elementary school."

"I did."

"Then why doesn't everybody go to high school?"

"Why, high school is for those who can pay tuition, and elementary school for those who can't."

In my mind's eye, to-night, I can see those children just as plainly as though they were sitting before me. Bright little boys, eager little girls, saying their lessons with eagerness, accuracy, and with pride. Yet I know what these children are to-day, and what they will be to-morrow—peasants, poor peasants, miserable peasants, tilling the ground with a wooden plow, threshing the grain with a flail, bound to the station of their fathers by the chains of a social system. The door of opportunity is shut. The race of life is fixed.

The Balkan village is stucco and tile; the Chinese, mud and thatch. The Russian is silver gray with double windows, all filigree. They vary in government and law, in crops and customs, in food, manners, and dress. But in one respect they are all alike. This is when, in the evening after the day's work is done, they gather to listen to the teller of tales. In Serbian and Czech, in Chinese and Choctaw, in Spanish and Arabic and Russian, we hear of Cinderella and her fairy prince, of the Ugly Duckling and his triumph. We thrill to the tale of the foundling in the bulrushes becoming the mighty law-giver, the lowly carpenter of Nazareth and the Savior of mankind. By the flickering firelight the vagrant camel driver becomes Mohammet; the little corporal, the grand emperor; the rail splitter, the war-time president. Even the first of the Ming Emperors, whose tomb is the greatest in China, was once an humble monk. Life may be insecure, liberty restricted, the pursuit of happiness an impossibility, but the world of imagination lives on, a world in which man has realized his universal ambitions, his greatest wants. Why does Cinderella marry a prince? Because the prince is the man whose life is protected, whose property is secure, whose children have an opportunity to go ahead. Why do the tellers of tales tell of Lincoln rather than Washington, of Napoleon rather than Alexander the Great? Because of the humble start. For it has long been the hope and dream of mankind that the time might sometime come when the worker would enjoy the fruit of his labor, when his person would be safe, when the race of life would be run from an unfettered start with a free field.

We have visited three villages. If there has been some exaggeration of present conditions, the main deductions have been true. Almost all over the world, to a greater or less degree men are bound down, insecure, and with little chance. But roll back the wheel of time a thousand years. Then we find this condition everywhere. There was constant insecurity, the robber baron took what he liked; human life was of little value; and no ordinary child had a chance. But when work was done and the tales of evening came, men and women forgot the sadness and strife of the day in their spirit land where life and liberty reside and the child of the peasant rises to gilded heights. All over the world for ages, millions of men and women have prayed for this time to come. For man longs not so much for rubies and diamonds, silks or laces, or for the wealth of the Indies; but rather for that condition of which these stories used to be the symbols—security of life, right to private property, and equality of opportunity.

We stand in the village a thousand years ago. The wheel of time rolls on. Men are born; men live their lives; men die. They hear not the shouts of the barons on the river plain at Runnymede. They know naught of the Petition of Right grudgingly approved by a reluctant king. Men are born and men die, living lives of hardship, but hoping. They hear not of Hobbes and Locke, of Voltaire and Rousseau, of the Habeas Corpus Act, of the Bill of Rights, of the rise of constitutional government, of the American and French revolutions. They know nothing of the establishment across the seas of a government which derives its just power from the consent of the governed; where man has a right to life, liberty, and the pursuit of happiness; where the equality of man is held to be self-evident. The old village continues its unbroken way. Misery abounds. Uncertainty and poverty hold sway. Only in the land of the spirit, in the story world, does the sun shine bright.

But word comes of a new land beyond the seas. There actually exists a government "conceived in liberty and dedicated to the proposition that all men are created equal." It is a fact, not a dream, that there is a place where men have security and property, and their children have a chance. Now comes the great rush of immigration. Savings are dug from the earth, meager possessions sold, loans secured, long journeys are made to the seaports. Bridges are burned

behind. In sailing vessels and in the steerage, crowded, uncomfortable, perilous voyages are made. And with little Cinderella by one hand and tiny Abraham Lincoln by the other they enter a new country to fight the battle of life anew, with a new language, new laws, new customs; but in an exactly true and literal sense it is the land of their heart's desire, the land of their dreams. This was the spirit of your forefathers and mine; whether they came in 1620 or 1920.

This spirit of democracy, this government of the people, by the people and for the people, grew and developed during the nineteenth century. In northern Europe, in the British Empire and in the United States, it strengthened as time went on. But the Great War called a halt—and to-day there is a decided setback. At no time in the last hundred years has democracy been so severely challenged as at the present.

We cheered when we heard that the Tsar had been overthrown—one of the world's greatest autocracies gone at last. Another great surge toward democracy, we thought. But to-day Russia lies abject, completely in the power of one per cent of its population, the Communist Party, which by virtue of the Soviet organization and plan of government is itself controlled by a very small band of men. My friend, Arthur Bullard, reports a conversation with Lenin held many years ago in Switzerland:

"You don't think the Russian people can rule themselves, do you?" said Bullard.

"No," said Lenin.

"And the Tsar should not rule them?"

"No," said Lenin.

"Well then, who should?"

"*I* should," answered Lenin.

In Lenin's own words we find his justification of minority rule. The people cannot govern themselves. Only an enlightened small minority should have the power, governing for the benefit of the people. This is the dictatorship of the proletariat, an objective as well as a subjective genetive. Lenin explains, and note his reasoning well. The people are *too ignorant* to know what is for their own good. They are *too hungry, too needy,* to be able to take a long look forward. They will agree to any policy so long as it brings immediate relief. They are *too unaccustomed* to self-rule either to master the

method of government or to assert their rights. Thus it is the result of ignorance, of hunger and poverty, of centralized government and habitual obedience to authority. The Soviet government appears to be gaining power day by day and extending its influence, especially in the Orient.

In the same way, in Italy and Spain, the Fascist movement has taken control. Here is the rule of a dictator, a benevolent dictator taking full command. He rules for the benefit of the people who are too ignorant, too poor, and too subservient to be able to govern themselves. Italy is certainly improving. A man who can clean up Naples is deserving of respect. But one trembles for the future. Will the next dictator be benevolent? Or the next? He rarely is.

The same development has taken place in Turkey and Greece, in Bulgaria and Hungary, and it has been long in effect in most of Latin America. Universally it is founded on ignorance, on poverty, and upon an absence of the experience given by local self-government.

I am not a political scientist and am only an indifferent historian. But I suspect in these characteristics can be found the essentials for the growth of democracy. Just as the seed requires warmth and moisture for germination, and good soil and sunlight for growth, so does democracy require faith in life, liberty and equality for its conception and education, prosperity, and local government for its advance.

Education, of course, depends primarily upon our school system. But, curiously enough, so do the other two essentials. National prosperity depends in part upon geographical situation, climatic conditions, and the wealth of natural resources. But in the main, well-being and physical comfort depend upon what we earn and what we spend, our productivity and our frugality, our work and our thrift; and these depend upon how we are trained. This will become increasingly important as our population increases, as our country becomes crowded, as our national resources become exhausted. In the main our prosperity depends upon what we do to our environment; and this is a matter of education.

Furthermore, people who are able to govern themselves must be stubborn and unafraid; obedient to authority when authority is proper, but never cringing slaves to the bureaucrat. They never can look to a central government for the solution of all ills. They cannot wait

for Paris, or Moscow, or Washington. Much of it depends upon themselves. Only in the conduct of government can the art be learned. Our local government has been the practice ground of American statesmen and voters. Now local government in the United States deals with streets and police, with fire protection and poor relief, with health and public utilities; but more than half of its total task is the school, the library, and means of adult education.

Thus the plant of democracy has its moisture from general education, its rich soil from national well-being, and its warmth and light from local government. All these depend upon our educational system. Education is not a product of democracy. It is not a result. It is an *essential.* It is a cause. Our educational system, more than any other social agency, more than the army, the navy, the treasury, the church, is the *defender,* the *perpetuator,* the *guardian* of democracy.

The argument, then, is as follows: It has long been the hope that the time might come when a man might have a right to his life and his property, and his children an even chance. This dream has lately been approaching realization in northern Europe, to a degree; in the British Empire, in part; and in the United States more adequately than some of our intellectuals realize. Just at present this advance is being challenged severely by the Bolshevik commissar, the Fascist chief, and the military politician. The countries where these reactions are taking place have three conditions in common—their people are unschooled; there is a lack of prosperity; and government is highly centralized. Reflection upon our own history reveals the opposite of these conditions as the probable bases of democracy. In the main, all depend upon education—mostly upon organized education.

The implications of this argument are perfectly plain. Schools and teachers, colleges and professors, supervisors and superintendents, board members and regents have a clear basis for judgment. Our educational system shall be directed and operated in such a manner that our democracy may grow and approach perfection. We must develop a trained electorate. This means universal education, protracted education, education for leading and following, education for self-discipline. We must also insure national well-being. Therefore, earning and spending, producing and saving, extension of present

improvements and the development of new, conservation of life and resource, and achievement of potentialities are paramount problems of the school. We must stimulate local self-government. Here our school system is at once a cause and an effect, an instrument and an object moved. We must see that our towns, our cities, our localities, are not objects of derision; but examples of proper administration. Most clearly our argument points to the importance of the institution for the training of teachers and the laboratory of research. Our schools must be in the best of hands. In short, this argument gives us an educational measuring rod. By it we can tell progress from mere change.

If the premises be sound and the conclusions logical and generally accepted, we teachers need have no fear for our profession. Quality of personnel and quantity of material support will both be attracted. For to us a trust is given. In our hands rests the perpetuation of that form of society which millions of men have desired and for which countless numbers have died. Our predecessors have handed us the torch, more brilliant than when it was passed to them. We must be faithful. We must hold it high.

PROBLEMS IN DIRECTING STUDY OF HIGH SCHOOL PUPILS

By CECILE WHITE FLEMMING
Psychologist, Horace Mann School, Teachers College
AND MAXIE N. WOODRING
Assistant Professor of Education, Teachers College

DURING the past twenty years administrators and teachers have shown an increasing interest in the pupil in contrast to the previous absorption in the subject matter of instruction. This period has been characterized by a greater attention to the child and an effort to adjust the materials and methods of instruction to the capacities and needs of the individual pupil.

With this shift of emphasis to the child, there has developed an awareness that a pupil grows only through his own mental activity and that he does not learn adequately merely by listening to instruction from the teacher. More progressive teachers are coming to accept the idea that their chief function is not to impose information but to stimulate and guide the pupil's learning. They are more inclined to consider the task of the classroom from the pupil's point of view; to ask themselves how the activities provided appear to the child; and how they may aid the pupil in learning, so that he may achieve to his maximum capacity.

The large number of books and articles which have been published upon the topic of supervised study and the question of how children learn would seem to indicate the desire of supervisors and teachers to make the pupil's learning more effective. As Shreve[1] points out, however, much of the earlier effort to aid pupils in study failed to show any improvement in classroom results which could be recorded in quantitative terms. Several factors may account for the inadequate return. Too seldom has there been any clearly thought-out or generally accepted meaning of the function of "supervised study." Too much emphasis has been given to the mechanics of the effort and too

[1] Shreve, F. *A Supervised Study Plan of Teaching.* Johnson Publishing Co., Richmond, Va.

little thought to the psychology of learning and of the direction of learning. Moreover, in whatever attempt has been made, inadequate knowledge of study techniques on the part of the teacher has decreased the return.

The present attitude toward study is dynamic. Learning is thought of as an active continuing process, which must go on when formal school instruction is ended. Schools are realizing that they should aid pupils in developing productive methods of independent work, so that mental activity will be continued with genuine enjoyment and effective results. It is encouraging that teachers who are now beginning to conceive of "supervised study" as the direction of the child's learning activities are attempting seriously to analyze their task, to see, and to evaluate the problems which confront them in the effort.

The present paper[2] has grown out of the experience of the writers in working with teachers in an effort to develop better methods for directing the study of high school pupils.[3] The voluntary coöperation of the teachers indicates their realization of the need for more effective guidance of pupil learning and their desire to develop better methods for such direction.

What problems have confronted these teachers in their previous efforts to direct the study of their pupils? What elements in the work have seemed to them most difficult? Of what needs are they most aware? Is it worthwhile to continue the attempts which have been made to help pupils to study more effectively?

The best criterion of these efforts is the extent to which they are a response to realized need and the degree to which success seems possible. If a need for improvement is felt; if this necessity seems real in the minds of those engaged in a task; if it is possible to achieve a solution, or to anticipate success with further effort, then the attempt is justified and desirable.

In the presentation which follows, the writers have analyzed the problems listed by 230 teachers engaged in junior and senior high school instruction. This material is presented as evidence of the

[2] This article is the first of a series by the authors on the direction of study of high school pupils. Future articles will treat of such topics as: recent investigations of the factors involved in study direction, and experimental efforts to improve such direction; annotated bibliography on study; specific procedures and techniques which have been developed by certain schools to improve the study of individual pupils and groups; the use of the assignment in directing study, etc.

[3] Materials developed in this and future articles on the problems of directing study have grown out of activities in the course Education 235K, *Directing Study of High School Pupils*, given at Teachers College, Columbia University, under the direction of Professor Maxie N. Woodring in cooperation with Dr. Cecile White Flemming, Psychologist of Horace Mann School.

reality of the teacher's interest in directing more adequately the study activities of high school pupils, and as justification for continued endeavor to achieve more effective methods of direction. An entirely accurate and rigid classification of these problems cannot be made. There is of necessity some overlapping. For example, the difficulty of differentiating the assignment to care for different ability levels within a class might be included either under the general head of assignment or under the problem of providing for individual differences.

Some of the difficulties more directly involve the teacher, such as her lack of time to diagnose and care adequately for individual pupil weaknesses, or her inability to give stimulating assignments with adequate direction for preparation. Others are more peculiarly the problems of the pupil, as inability to read accurately, or the handicap of physical defect. Some of the problems of better study techniques are equally the concern of teacher and pupil; the latter must acquire skill in selection of the main points in material read, but it is the teacher's task to guide and to aid him in developing the new skill. Still other factors require the coöperative consideration of teacher and pupil, school and home, to provide better conditions for the child's work and growth.

The following organization has been employed to make compact the classification of problems presented.

I. Problems which arise from inadequate knowledge or skill on the part of the teacher:
   1. Insufficient knowledge and use of the psychology of learning.
   2. Difficulty in making adequate assignments with reference to such elements as definiteness of task, precision of directions for work, and stimulation of pupil's interest.
   3. Too little time to do the kinds of work desired in class instruction, in providing for individual differences or in obtaining more intimate knowledge of the pupils.
   4. Insufficient information about individual pupils, their ability, needs, working conditions, etc.
   5. Lack of preparation in the use of diagnostic instruments or procedures for studying class or individual problems, such as mental tests or tests of reading skill.
   6. Insufficient training in evaluating methods of teaching the pupils how to study; and in giving pupils necessary training

in specific study skills, such as reading, problem-solving, use of books, and other materials.

II. Factors and conditions which directly affect the study activities of the pupil:
   1. Home conditions.
   2. Conditions for study at school.
   3. Physical condition.
   4. Ability to learn.
   5. Previous training and accomplishment.
   6. Attitudes and interests.
   7. Habits of work, and methods of study involving specific study skills, such as reading, outlining, summarizing, problem-solving, following directions, judging and organizing facts, memorizing, and knowledge and skill in use of books, references and other work materials.

PROBLEMS DUE TO INADEQUATE EQUIPMENT OF TEACHERS

1. *Insufficient Knowledge and Use of the Psychology of Learning.* Sixty-five teachers (of the 230) report that their most difficult problem in directing the study of high school pupils has arisen from their own lack of knowledge of the psychology of learning. These teachers emphasize their inability to determine the best study techniques and their lack of skill in training the pupils in the formation of adequate study habits. Some of the specific problems listed by the group are of decided significance:

1) The application of the simple laws of learning in directing pupil activities in various high school subjects.
2) The necessity for training the teacher in study techniques so that she may in turn train the pupils.
3) The development and adaptation of study procedures in specific subjects.
4) The direction of pupils in the acquisition of methods that will be economical for the immediate course and which may be carried over to later tasks.
5) Guidance of pupils in developing standards of mastery so that they will know when a thing is learned and not merely half-learned.
6) Pupils are, as a rule, interested in the degree that the teacher

is interested and enthusiastic. The problem is to maintain work on a high interest level.

2. *Difficulties in Making Adequate Assignments.* Fifty percent of the teachers stress the assignment as the factor which creates for them serious problems in directing study. Their statements indicate their conviction that the assignment has certain definite and important functions, but that they are unsuccessful in getting the results desired. Problems are reported more specifically as shown below:

1) Insufficient thought and preparation in planning the assignment.
2) Inability to obtain an acceptance by the pupil of a worthy purpose for performance of the task.
3) Stimulation of preparation of the assignments by appealing to the interests of adolescents and by providing for real needs growing out of pupil experience.
4) Prevention of loss of interest due to too long lapse of time between the assignment and preparation.
5) Avoidance of assignments so long that successful accomplishment is impossible in the time available for preparation, with consequent loss of interest.
6) Guarding against too many and too varied activities, resulting in divided interests with consequent bad habits of work, and unsatisfactory accomplishments.
7) Difficulty in presenting work to be done so that it is clearly understood by the pupils; also, the difficulty of ascertaining whether *every* pupil understands.
8) Gauging the difficulty of work so that success is possible for each pupil.
9) Determining essential requirements, and differentiation of assignments to suit the various levels and types of ability existing in the class.
10) Inclusion of challenges to mental exploration by the pupil, thereby stimulating real thinking.
11) Provision for continuity of work by presenting new problems as a continuation of previous experience and anticipation of future problems.
12) Correlating with other subjects and outside activities.
13) Focusing attention on important elements in the new problem.

or task, and directing the attack in such a way as to increase interest rather than lessen it, to stimulate effort, and to overcome seemingly insuperable obstacles for accomplishment.

14) Providing the necessary tools for preparation by training in study procedures and techniques, and in selection, organization and use of material, thereby developing effective habits of independent work.

15) Giving to pupils devices for checking the mastery and performance of work undertaken.

16) Evaluating the effectiveness of an assignment by the quality of response during the presentation of the assignment, and by the adequacy of pupil preparation.

17) Providing sufficient time for adequate consideration of the assignment and determining the psychological moment for its presentation.

3. *Insufficient Time in Teacher's Daily Schedule for Pupil Diagnoses and Remedial Work.* Twenty-three teachers emphasized the fact that a crowded teaching program or insufficient time in the class hour prevents them from carrying out desired procedures, even when they recognize the desirability of better practice as expressed in carefully prepared assignments, adequate presentation to the class, more attention to the needs of individual children, and the provision of interesting study helps.

4. *Insufficient Information about Individual Pupils.* Twenty-nine teachers realize the need of having a more intimate knowledge of individual pupils in order to provide more effective instruction. They regret that a heavy teaching schedule precludes visits to the homes and intensive study of individual children. Many emphasize the desirability of learning as much as possible about the techniques of standardized tests and other objective measures of school achievement. Others in stating their own needs urge the importance of psychological service for even the smaller school.

5. *Lack of Teacher Preparation for Diagnosis and Remedial Instruction.* Forty-seven reports stated that the writers' efforts to improve the study of their pupils are handicapped by insufficient preparation in the use of diagnostic instruments and by uncertainty as to suitable remedial measures. It is not difficult for any teacher to-day to increase her knowledge of mental and achievement tests and other

diagnostic aids. Such information is readily available in teachers colleges, and in a number of excellent books on pupil measurement and guidance written particularly for the teacher. Perhaps the best incentive to a teacher to increase her knowledge and skill in these respects is to engage in analysis of the causes for any unsatisfactory achievement in her own class.

6. *Inability of Teachers to Give Training in Specific Study Skills.* In what study techniques should pupils be trained and how should these skills be developed by the teacher? This question typifies some of the difficulties which confront fifty-nine teachers in their efforts to direct the study of high school children.

One teacher raises a question which points to the fundamental differences in basic philosophy between the older types of supervised study and the newer conception of directed learning. She asks, "Shall all study be supervised? When should study become independent?" The proper direction of learning does not imply the constant presence of a "supervisor"; it means rather that the definitely outlined task and training in proper procedures given in the classroom will continue to direct or help the pupil, even though he may be working in a school study room or alone at home.

The presentation of questions as fundamental as these emphasizes the extent to which teachers are thinking about and analyzing the problems of directing study. Their awareness of the problems is a challenge to administrators, supervisors, and all concerned with the training of teachers in service to work very seriously at the task of giving teachers training for the direction of study. The results from Butterweck's [4] evaluation of several methods of giving high school pupils training in techniques and habits of work suggest the kind of information which should be given to teachers in a program of coöperative study preliminary to their own attempts to train their pupils. In Wisconsin, Maybelle Bush, State Supervisor of Elementary Education, has for three years been teaching teachers step by step how to train pupils in specific learning procedures, before expecting them to use these same techniques in their classrooms. Barton's [5] lessons on outlining provide definite aid to both the teacher and the pupil.

[4] Butterweck, Joseph S. *Teaching High School Pupils How to Study.* Teachers College Contributions to Education, No. 237.

[5] Barton, W. A. Jr. *The Effect of Outlining upon Achievement.* A study in progress in Horace Mann High School for Girls.

FACTORS AND CONDITIONS WHICH DIRECTLY INVOLVE THE PUPIL

1. *Home Conditions.* Unfavorable conditions in the home were reported by twenty-seven teachers as interfering with study. The conditions include those listed below:

1) Overcrowding so that the pupil has to study in the midst of noise and distraction.
2) Bad lighting and ventilation.
3) Excessive time and energy given to aid the family in earning a living.
4) Excessive attention to social activities and amusements.
5) Insufficient out-of-door exercise.
6) Illiterate or uninterested parents.
7) Low cultural level and little or no stimulation from books and magazines in the home.

Although there is much question to-day as to the amount of home study which should be required, if any, the conditions for work at home present a real problem to teachers, because the requirement of home study is a prevailing practice.

2. *Conditions for Study at School.* Forty-five teachers emphasized the necessity for improvement in the conditions for study at school. The unsatisfactory conditions listed range from the waste due to studying in a badly chosen, excessively noisy room to the lack of any real supervision by a teacher or other trained person. The various improvements needed are shown in the following:

1) A room for study well chosen with reference to location, size, and quiet (if the study activity must be provided for in a study hall).
2) An increase in comfort in terms of light, heat, humidity, and adequate ventilation.
3) Suitable and comfortable furniture.
4) A school atmosphere conducive to work.
5) The aid of a study-program card in the hand of each pupil.
6) A well-equipped library in charge of a trained librarian who will give instruction in the use of books.
7) Need for adequate direction of study by the classroom teacher.

The problem of overcoming the handicaps of the usual study hall was referred to definitely but once. It was referred to indirectly twenty-five times in such questions as how to direct effectively the study of large groups of pupils. In the one instance, the statement was made that a single teacher present may keep order and note attitudes and behavior in general, but she cannot adequately direct learning in the many subjects under preparation at any one period.

In answer to a questionnaire sent by Elizabeth Thorndyke [6] to 1,600 high school pupils, 70 percent voted for home study against 30 percent for study at school. The reasons emphasized the weaknesses of many school study halls. These pupils who preferred home for study did so because of greater quiet, no disturbance by fellow-workers, greater leisure, greater physical comfort, and better equipment.

3. *Physical Condition.* Fewer problems were reported under physical condition of pupils than might have been expected a few years ago before school medical examination, attention to health habits, and preventative measures had reached their present development. Only twelve teachers emphasized health as an acute problem. Where physical defect exists, however, it may be extremely important, even critical, for any solution of study and learning difficulties. Data on health and physical condition should be on file in every school for use in regular supervision or in any corrective program.

4. *Mental Ability as a Factor in Learning.* Mental ability as a fundamental factor in learning was stressed in the question of handling pupils of inferior and subnormal capacity where they must be members of regular classes in academic subjects. The questions related to the adaptation of the assignment and to difficulty in finding the large amount of time required for instruction of slower pupils in techniques of study. In giving necessary aid it is difficult to prevent their use of direction as a crutch.

Differences in mental quality within a single group create a problem for seventy-one teachers. The problem has varied aspects:

1) To provide tasks and stimulation which will keep the ablest pupils working on a high level so as to assure progress and to maintain interest and initiative.
2) Not to neglect the less able pupils and not to prevent success and deaden enthusiasm by too difficult tasks.

[6] Thorndyke, Elizabeth. Environment as a Factor in Pupil Study. *Education*, Vol. 40, April 1920.

3) To give suitable instruction in procedures for the different levels of capacity.
4) To find time to meet the varied needs in materials and procedures for the entire range of abilities and interests within the class.

A total of one hundred forty-one reports presented a variety of problems in meeting individual differences in pupils' abilities, achievements, and interests. This emphasis upon the needs of the individual child shows clearly how far teachers have progressed from the previous absorption in subject matter apart from the pupils. The statements show that they are concerned with utilizing as fully as possible the entire equipment of each pupil. They wish to take account of variations in mental ability, in previous achievements, in interests, in physical condition, in conditions for work, and in present skill in study.

One thoughtful teacher raises the question of how the several aspects of study direction can be handled so that it does not become literally an individual matter. As Butterweck[7] points out, a great deal has been said and done in the recent past about division of classes according to ability and about differentiating school work, but too little has been done in developing techniques which the average teacher can use in meeting the real problem. The efforts at adjustment have therefore become administrative adjustments without instructional counterparts.

5. *Attitudes and Interests.* One-hundred-eleven teachers presented varied situations which emphasize the importance of the pupil's attitude toward school work and involve the crucial problem of arousing and maintaining the interest of the pupils in the work to be done. They are convinced of the value of interest in learning and many of the reports place the responsibility of securing interest on the teacher. But the repeated query is, How can interest be aroused and maintained? In some instances the problem is complicated by a lack of mental ability requisite for the level of work being attempted; sometimes individual or home conditions, such as physical defects, fatigue from outside work, or excessive social activity, result in lack of interest. Frequently a child responds to the evident interest of the teacher in him and the results of his work. He has become convinced

[7] Butterweck, J. S. *Ibid.*

that there must be something worth consideration in his school work if the teacher is genuinely concerned over his behavior and lack of accomplishment. This is extremely significant since the pupil's attitude is one of the most powerful factors in learning.

Certainly where a teacher is troubled by lack of response in a class or in individuals, a careful effort at diagnosis is the first step toward improving the situation. All that has been said elsewhere in this report relative to the importance of the assignment and the differentiation of work to meet individual differences is fundamental to the maintenance of pupil interest in school work.

6. *Methods of Work.* The necessity for more effective methods of work was reiterated by two hundred twelve teachers. Those responsible for pupil achievement through study have given too little attention to such matters as a suitable place for study, budgeting of time, adequate equipment, and training in methods of work. The element of time is often in the thought of the teachers reporting in this study, sixty-seven having made reference to it in the problems presented. Their emphasis would seem to justify much attention to the budgeting of the pupils' time so as to insure regularity of work and a sufficient expenditure of time for satisfactory accomplishment.

The combined effort of administrator, teacher, parents, and child is needed to achieve the desired result. It is obvious that the amount of time spent in study is conditioned not only by all the activities which occupy a pupil in a day, but also by the more fundamental factors of the nature of his school tasks, the appeal of the work, genuine interest, and his knowledge of how to go at the task. The results of careful observation and tests of how high school pupils work as reported by Symonds,[8] Finch,[9] Charters,[10] and Messenger,[11] and pupils' own reports of attitudes and methods of work, reveal the prime responsibility of the school in this control of time and application in study. This responsibility rests primarily on the teacher. The assignment, in its clarity and stimulation of a real interest, and the instructions for preparation do much to set the child at work.

[8] Symonds, P. M. "Study Habits of High Schol Pupils," *Teachers College Record,* April 1926, p. 713 ff.

[9] Finch, C. E. "Junior High School Study Tests," *School Review,* March, 1920, Vol. 28, pp. 220-226.

[10] Charters, J. A. "Methods of Study Used by College Women." *Journal of Ed. Research,* Dec., 1924, Vol. XI, pp. 344-355. "How 258 Junior College Women Study." *Journal of Ed. Research,* Jan., 1925, Vol. XI, p. 41 ff.

[11] Messenger, W. J. "Improving the Skill and Habits of Study for Pupils in the Junior High School." Study in progress in Horace Mann High School for Girls, 1927-28.

The value of regularity in study, however, is not to be minimized. Interesting evidence of the importance of time and regularity is given in Strang's [12] analysis of the study schedule of forty ninth-grade pupils in the Horace Mann High School for Girls.

In the entire list of study problems reported by these teachers, the need for training in specific study procedures was emphasized more than any other single factor. The problems of specific procedures mentioned were many but only a few can be referred to here.

1) *Reading.* One hundred thirty-three reports emphasized inadequate skill in reading as a factor retarding learning in the high school. The weaknesses reported in comprehension range from sheer lack of vocabulary and difficulty in the mechanics of reading to inability to get the main point, to note relationship of ideas, or to evaluate the ideas obtained. Thirty-one teachers stress the necessity for training pupils to read more rapidly. Teachers as well as pupils need to become more aware of the different kinds of reading. A pupil in the high school should be taught how and when to "skim" as well as to read and comprehend small details. The emphasis by these teachers in the field upon the problem of skill in reading is in accord with the experimental findings of the many recent investigations of reading achievement. The factor of intelligence level must be considered in any effort to improve reading.

2) *Outlining and Summarizing.* Thirty-six teachers laid particular emphasis upon the importance of skill in outlining, the lack of such skill in the pupils' equipment, and the necessity for the teacher's knowing how to give the specific training. Inability in summarizing is mentioned in forty-one reports.

3) *Use of Books and Materials.* Fifty-three reports urge the need of definite, graded instruction in the use of books and reference materials. With facility in using such aids, will come an increased realization of their value in daily work. A more adequate supply of reading and reference materials and the service of a school librarian are the first steps toward giving pupils the training suggested and toward stimulating teachers to attempt more varied and flexible assignments.

4) *Following Directions.* In seven papers the importance of pupils being able to follow directions precisely was accompanied by emphasis upon their lack of such skill. The query also appeared as

[12] Strang, R., and Sturtevant, S. M. "Study of the Twenty-four-Hour Schedules of Forty High School Girls," *Teachers College Record*, June, 1927, p. 994.

to the extent to which this skill could be developed as a general function and how much it must be specialized in relation to specific subject matter.

5) *Problem-Solving.* Forty-eight teachers were concerned with the inability of pupils to recognize a problem situation; to analyze the conditions of the problem; and to obtain a solution with appropriate technique and a minimum of trial-and-error effort. The situations cited ranged from practical arts and mathematics to history and literature.

6) *Memorizing.* Of the thirty-eight teachers who included problems involving memory, only seven emphasized as an independent problem pupils' lack of ability to memorize or retain facts, and the necessity for teaching them better methods of memorizing. The other thirty-one asked "How can pupils be trained to rely less upon sheer memorizing in preparation of a task? How can they be taught to analyze a task rather than memorize, thereby obtaining a true comprehension and evaluation of its elements as a basis for retention?"

7) *Checking Results.* Twenty-seven reports not only stressed the pupils' lack of skill in checking results, in knowing when they have accomplished a task satisfactorily, but deplored the fact that they have not been made aware of the necessity of checking results as an important part of a task.

A question which constantly recurs in the minds of these teachers is *"How can these study procedures be taught?"* Book [13] reports distinct and concrete gains by college students resulting from a special course on "How to Study." The objective evidence of the value of the instruction was the gain in credit points made "before, during, and after" the course by the students enrolled, in contrast to the record made by all freshmen. The author describes the techniques taught and ascribes the scholarship gain to learning how to conserve time by making daily schedules for work; to the careful planning of each task through analysis of the task, and by determination of the best method of doing it; and to the acquisition of greater skill in reading, both in speed and in comprehension. It is worthy of note, however, that the best results were obtained in the two laboratory

[13] Book, W. F. "Results Obtained in a Special 'How-to-study' Course Given to College Students," *School and Society*, Oct. 22, 1927, Vol. XXVI.

classes where the instruction in study was given in connection with their class work in psychology.

Cunningham [14] describes the content and method of conducting a one-semester course for high school pupils on "Teaching how to Study." He emphasizes the necessity and possibility of relating the methods taught to the regular work of the classroom. The pupils made up stimulating questions in one subject as a guide to study for six weeks. In another, they made and utilized outlines of material read; in a third, they listed supplementary problems in reading; and in a fourth, they obtained some understanding of how class discussions and study should stimulate thinking by recording ideas and experiences. Before the experimental study was begun, a list of skills and abilities most necessary for effective study was compiled. When a certain ability was being studied, the class worked on materials dealing with that ability. When a new ability was first taken up, the pupils were tested by both standard and informal tests to see how much of the special ability they already possessed. Comprehension of reading tests, memory tests, and others were used. The teacher scored the tests as soon as given and devised some method of presenting the results graphically to the class, after which they discussed methods of securing the results desired. In every case whenever directions for acquiring a skill were given, a practice period of directed study was provided. When any student's particular difficulty had been diagnosed, and practice for overcoming this difficulty had been provided, he was required to check his achievement at regular intervals.

CONCLUDING STATEMENT

The variety of difficulties presented by the 230 teachers who cooperated in this report reveals the complexity of the problem of directing study. The low frequency of report for certain significant factors indicates that many teachers are not aware of the presence of these elements in the problem. That the teachers are genuinely interested in improving the study habits of high school pupils is evident. The reality of the problems reported is verified by the results of numerous inquiries and experimental studies of school achievement, and of the factors involved in pupil learning.

[14] Cunningham, Harry. "Teaching How to Study," *School Review*, Vol. 33, pp. 355-362.

The importance of the problems raised by these teachers with regard to specific study procedures is recognized in such an effort as that recently made by Indiana University to give the freshmen definite training in methods of study.[15] The results from the Indiana investigation indicate that students can be interested in a program to improve their methods of work. Practical help can be given and real improvement achieved. Book, reporting results from this effort, says the weakness of students and their need for help has been shown by the many studies of school achievement and analyses of school failures. Pupils do acquire methods of work without outside help, just as they acquire information and other skills, by trial-and-error experience. But just as we do not expect a prospective physician or lawyer to learn and acquire skill by sheer experience and trial and error, no more should pupils and students be expected to learn unaided how to make and utilize specific plans for work, how to make an effective analysis of their tasks to find precise and best methods of work.

Directing study must be considered as a part of the teacher's work in the classroom. The supervisor of instruction, the heads of departments, the teachers, all must think of the child's active learning as their fundamental concern. Organization of subject matter, and procedure in the class hour must be directed toward that end, or the school has failed to meet its full responsibility. Learning and direction of learning cannot be conceived apart from the work of the teacher in the period which she and the children spend together. Study in any other place or period can be only an extension of the learning begun in the class hour. Butterweck[16] concludes his study with the caution that providing for the supervision of study separate from the regular classroom activity does not insure a solution of the problem; a complete reorganization of the procedure and use of time provided for teacher-pupil contact is necessary. He offers suggestions for such changes. He also offers for consideration means by which the reorganization can be brought about through the teacher in service.

If the pupil has not had training previous to entering high school, then special training should be provided, utilizing regular assignments for practice, supplemented by carefully directed study by the teacher and by the study hall supervisor. This special training should

[15] Book, W. F. *Ibid.*
[16] Butterweck, J. S. *Ibid.*

be considered as a temporary remedial procedure. It should be recognized as remedial, just as corrective work in reading has been required to overcome the previous failure of the school to give adequate instruction. With the intensive and widespread investigation of reading processes and the consequent growth in teachers' knowledge of and skill in teaching reading, sound instruction is steadily reducing the necessity for corrective work in that subject. Such should be the development in the direction of study.

Our schools and teachers colleges working together should plan to provide high schools with supervisors of instruction and teachers more adequately prepared to guide study. The teaching staff should be supported and aided by a psychological service skilled in diagnosis of pupil quality and competent to help determine procedures in specific situations. Each department should be staffed so that the teachers themselves may have a program which will leave them time and energy for careful planning of assignments and the work of the class hour. Thus more desirable activity and learning by the pupils will be assured.

While school administrators are working toward such practical provisions, the research facilities of our public and private schools and universities should continue their studies of learning. They should experiment to discover the effectiveness of certain study techniques, and determine the best methods of teaching these techniques and skills. Such scientific approach to the problem of directing study is necessary for a solution.

CURRICULUM PROBLEMS IN JUNIOR HIGH SCHOOL MATHEMATICS

By WILLIAM DAVID REEVE
Professor of Mathematics, Teachers College

THE human material with which we deal in the seventh, eighth, and ninth grades of the junior high school is very different from that of the corresponding grades thirty or more years ago. Not only is this true, but they differ more widely among themselves than did their predecessors in native ability, experience, and interests.

A generation ago the great central objective of the high school was to get pupils ready for college. To-day the central aim is to develop well-educated citizens. These changes in the nature of the high school population and in the great central purpose of American education have brought about a need for changes in the more specific objectives in teaching particular subjects like mathematics. In many schools to-day we are developing neither scholars nor well-educated citizens. The thoughtful teacher realizes the need for adjustments to meet the demands of the times. The "humdrum" teacher is content to let things remains as they are.

In the junior high school the course in mathematics has been better organized than that of any other subject, but it has been too much a shoving down of the traditional material from the senior high school field. One needs only to examine a few of the many series of mathematics texts to see that this is true. As a result the senior high school teachers object to the teaching of certain topics like demonstrative geometry in the junior high school because they feel that such teaching will spoil the pupils for the later work in the same subject in the senior high school.

We must approach the final solution of the problem as scientifically as possible. The organization of the curriculum should be fundamental and more psychological than the traditional course. In order to do this there are certain important steps in curriculum building which must be kept in mind.

In the first place, we must find out what mathematics is worth learning as far as the well-educated citizen is concerned. This involves the setting up of valid objectives to be obtained in teaching the subject. The second step is to determine the nature and the extent of the content material which will best enable teachers to realize these objectives. In the third place, we need to study our methods of teaching and learning. We know a great deal about the former, but practically nothing about the latter. Teachers ought to know more about how pupils learn mostly easily and most economically. To-day we do not know how long it takes to teach anything. Granted that the objectives chosen are valid, that the content material selected is best suited to realize these aims, and that our methods of teaching are satisfactory, we still need to find out what part of the content material can be learned by a pupil at a given age. It is probable that we are trying to teach too much or that we are attempting to teach things that are too difficult, or both. The fourth step is to provide a testing program that will enable us to find out how well certain fundamental aims have been realized, if at all.

Such procedure means that curriculum construction will be dynamic, that a curriculum committee will be a standing committee. We ought to be constructively critical of our content and methods at all times. This is just the place where we have failed in the past, because in regard to content, at least, certain parts of traditional material has remained unchanged for over two thousand years. One would hardly dare to express an opinion as to the age of certain matters of technique.

What has been said above is no a priori argument against any of the time-honored content material or methods of presentation that can be justified on any rational basis. The fact that any topic or method has stood the test for ages is some reason for respecting both, but it does not mean that age alone gives the topic or method precedence over any other, or that it should become sacred. Professor Nutt says:[1] "Teachers and supervisors are inclined to think in terms of the subject instead of in terms of the student. Subject-matter has been standardized instead of stages of mental maturity of students. The teacher and the supervisor have been dealing with the subject so long that it has become a familiar acquaintance; hence it has be-

[1] Nutt, H. W. *The Supervision of Instruction.* Houghton Mifflin, 1920, page 53.

come more or less a sacred thing. The subject has become a habit with them; it is regarded as something permanent and abiding; hence to leave out any of the sacred facts seems almost sacrilegious and criminal. On the other hand, the student is transient. Students come and students go; hence to leave the student out is justifiable. In fact, leaving the student out may be getting rid of an unappreciative butcher who haggles and mangles the sacred subject most horribly in his attempts to find food for mental maturing. The relief that is usually manifested by teachers and supervisors when the student, who is not getting on, drops out is a definite indication that the subject is more important to them than is the student. Whenever teachers and supervisors begin talking about education by means of the subject 'getting on' in the student instead of the student 'getting on' in the subject, then a radical change will come about in the teaching in secondary schools."

It is evident that no satisfactory list of objectives can be set up merely by consulting existing courses of study. While they may be used as evidence of what is being taught throughout the country they do not often give much help in suggesting what ought to be taught. Moreover, it is well known that some of these courses, if not all, tend to perpetuate certain obsolete processes and antiquated business methods.

It is equally true that the best objectives cannot be secured by making an inventory of the current textbooks in mathematics. In most schools they are the courses of study. They, too, are frequently guilty of overemphasizing unimportant or obsolete material. It is also true that not all textbook writers are able to suggest newer and better things. Often their books are made to conform exactly to certain state syllabi or other courses of study.

The standardized test makers of recent years have erred in including in their tests exercises and problems that thoughtful teachers everywhere have no desire to see perpetuated in our schools. In fact many of these undesirable elements were obtained by the makers of tests from existing courses of study and textbooks. Thus, it is obvious that such tests cannot be used as the sole basis for determining a list of desirable objectives.

We also know that it is not safe to try to determine what mathematics ought to be taught by counting the frequency with which cer-

tain mathematical terms are used in a few current editions of newspapers and magazines, although some writers have seemed to believe that such procedure is valid.

Finally, it is fair to say that we cannot determine our objectives by going out in the world and asking Tom, Dick, and Harry what mathematics is useful to them. The fact is that not one of them ever knows just what use he has made of mathematics. Moreover, they probably have given no thought to the question of determining how they might have used mathematics profitably if they had only thought about it a little while or if they knew more about it.

Any and all of the above criteria may be of service to us in making up a list of desirable objectives, but they will not suffice. If the objectives set up are to meet our modern needs, we must have at least one other criterion that is supported by vision though it should not be visionary. This last criteria is the opinion of expert teachers of mathematics—those who are able not only to tell how they use mathematics, but also to show how mathematics may be used in the present and in the future for the betterment of mankind.

When people have to consult with experts they usually get the opinion of the best they can afford or find. The writer has had the assistance of such a group of experts in setting up a list of objectives[2] in mathematics for the junior high school, but the list is too long to include here.

If all the children of all the people are coming to high school, and it should be possible for every normal American boy and girl to do so, two things ought to be accomplished. First, the boys and girls should be given an opportunity to learn more about mathematics than their ancestors knew. The modal or common amount of mathematics actually learned by the ordinary American youth is not half of what he ought to be able to appreciate if only we were alert in waking up to our possibilities. For some we shall have to make the content simpler and less formal. We shall have to teach them not so much mathematics, but more about mathematics. They can't all be of the research type. For those who like the subject and who have the ability to pursue it further, we ought to provide a course by the end of the senior high school that will at least include everything up to and including the fundamental ideas of the Calculus. Mathematics has

[2] Smith, D. E. and Reeve, W. D. *The Teaching of Junior High School Mathematics*, Chap. III. Ginn and Co., 1926.

played an important part in the development of human affairs and it is perfectly clear that it will continue to do so. To be truly educated one should have some idea of the rôle mathematics has played in human progress, and to appreciate as fully as possible its power and its beauty as a science. All of this means that our elementary courses should cover as broad a range of mathematical ideas and processes as possible. This is why the Calculus should not be left out. It need not be left out if we are careful to omit some of the "dead wood" from our courses. Such a scheme takes into consideration both the necessity for a happy and more intelligent followership and the right type of leadership. The trouble with our traditional scheme is that it makes our brilliant students the most retarded of all. Our educational machine is geared so as to turn out a product that is mediocre.

To continue traditional organization of content and method means to continue the practice of failing large numbers of pupils instead of trying to give them a course with which they can succeed. Nobody can justify the large percentage of failures that we find in algebra in so many schools. It is a bad thing for any child to fail. The loss to mathematics itself and to the children who fail is far greater than we realize. Many a student has been marked "failed" when he really has succeeded in the best sense of the term. So much depends upon what we expect of him and upon what he really can do.

As Professor Nunn[3] has so well pointed out: "Mathematical truths always have two sides or aspects. With the one they face and have contact with the world of outer realities lying in time and space. With the other they face and have relations with one another." The first he illustrates by saying that one is enabled to determine by scale drawing or by calculation the height of an unscalable mountain peak twenty miles away from the fact that equilateral triangles have proportional sides. While, on the other hand, the truth itself can be deduced with complete certainty from the assumed properties of congruent triangles.

According to Professor Nunn, our main objective should be to make children realize, in an elementary way at first, this two-fold aspect of the growth and development of mathematics. How can we plan our courses so that we may realize most fully such an objective? In the first place, it seems to me that we should not plan sep-

[3] Nunn, T. P. *The Teaching of Algebra*, page 16. Longmans, 1927.

arately for the two aspects, the practical and the theoretical, in the curriculum. Let us therefore try to choose hypothetically as the most desirable and important that theoretical content which is at the same time the content which arises naturally out of the child's attempts to apply his mathematical ideas and methods to practical ends in his daily life. And by "practical" I do not imply the narrow use of the term which is so often misleading.

If we can have agreement on this last point, then we are compelled to select as a basis for theoretical discussion those topics in mathematics in which the practical value of the content material is most clearly represented. This is not an easy task because it is not always easy to get general agreement as to what things are practical. Moreover it is well to remember that in actual classroom practice we should not only try to conserve the things which are certain to be practical or even contingently so, but to eliminate from the course such material as is impractical if not impossible or obsolete. Such reorganization alone, if honestly carried out years ago by teachers of mathematics, would have made the lives of many children much happier as well as more valuable.

In line with our purpose we should place more emphasis upon a clearer understanding of fundamental concepts and methods of thinking and less on the pure algebraic technique and ease of doing mechanical processes. It is doubtful whether the automatic application of principles develops anything that can be considered of general educational worth in itself. This does not mean that we should not develop skill in the manipulation of algebraic processes, but only to the extent that certain matters of mathematical thinking may be understood. I say this because a great majority of our high school students do not continue the study of mathematics beyond the ninth or tenth grades at best. And even for those who continue because they like mathematics, or expect to need it, greater power for future work will be gained if the time is spent in giving them insight and appreciation rather than mere emphasis on manipulation.

In the first place, it is pretty well agreed that the majority of students will never have occasion to use the skill they acquire and hence had better spend the time to better advantage. We ought to determine just what these skills are that need not be highly developed and also to determine those skills that all will need to have developed for

later use and dwell only on these until they are completely mastered.

Again, our conventional methods have delayed the teaching of many interesting and valuable things in the elementary and secondary schools. The English and continental schools of Europe are far in advance of us in the way they have organized their courses in mathematics. Very few adults in this country ever had any opportunity in the high school to obtain any idea of space relations through a study of space geometry. Every normal child should obtain some of the fundamental ideas of solid geometry although much of what has traditionally been taught should be omitted. It seems perfectly clear at this time that the conventional tenth-year course in geometry will soon become a combined course in plane and solid geometry where the general mathematics course is not adopted. It seems unintelligent to live in a world of three dimensions and teach the geometry of Flatland.

The elementary ideas of trigonometry, in many respects very simple, have been omitted altogether from the mathematics work of most secondary schools. Much of this work is not only easier for an ordinary ninth-grade pupil than many topics in algebra, but is far more interesting and more valuable. Besides, trigonometry gives us better than any other subject an idea of our "infinitesimal nature" in the midst of space about us.

What harm can come from omitting a great deal of the material that we have been teaching in arithmetic, algebra, and geometry and taking for granted much more that we have been forced to try to prove with little or no success? The old-fashioned geometrical method of proving the Pythagorean Theorem can be replaced by a simpler and shorter algebraic method known to every competent teacher.

Taking the country as a whole the teachers of junior high school mathematics have made greater progress in solving the problems connected with their part of the curriculum in mathematics than have the senior high school teachers in their field. There are several reasons why one is justified in making such a statement. In the first place, some of the junior high school teachers are better teachers, even though their knowledge of advanced mathematics is meagre. Perhaps this is because so many of them have been recruited from the ranks of the teachers in the elementary school, many of whom are graduates of our best normal schools and colleges. Secondly, some

of them understand child psychology better and have had more experience and training along this line. In the third place, they have not been so hampered by tradition in organizing a course of study for the seventh, eighth, and ninth grades. This has enabled them to be more progressive and experimental in their methods in trying to find out the best material to include in each grade. Again, they do not have to prepare their pupils to meet extramural examinations and hence are not obliged to point all of their work toward one final test thus becoming formal and wooden in their methods.

The result of the combined efforts of all those interested in the teaching of junior high school mathematics has had a salutory effect. We have to-day a rather wide agreement as to the general features of the course in junior high school mathematics, even though the order of treatment of topics is not standardized as it has been in the senior high school. Thus it is quite generally agreed now that the course in mathematics in the junior high school should be determined by the general purpose stated previously, namely, to develop well-educated citizens.

This difference in purpose makes a difference in content possible. It permits us to open the door of mathematics to every boy and girl so as to give a broad view of the subject in order that each one can choose according to his ability and preference having seen the general nature of the subject and what the science means. If his taste and needs require it, the pupil should be permitted and encouraged to go on. If not, he should not be forced to continue the study too long.

Because of the wide range of individual difference in native ability, experience, and interests we need to keep in mind the guiding principle in the selection of subject matter for each grade. This principle states that the subject matter selected should be that material which will be most valuable to the pupil provided he leaves school at the end of that year. In accordance with this principle the aim in the seventh grade should be to keep up a proper use of the fundamental skills in arithmetic which the pupil has learned in the first six grades. This is done by giving such applications in the arithmetic of the home, of the store, of the bank, of thrift, and the like as the well-educated citizen is likely to need. In addition, the pupil is introduced to the study of intuitive geometry, a subject in which he looks at a figure and draws certain conclusions. For example, he looks at an

isosceles triangle and says "the base angles are equal" because he cannot conceive of their being otherwise. In other words, "he feels it in his bones."

There are three questions in geometry which may be asked about an object. First, "Where is it?" Second, "What is its shape?" Third, "What is its size?" The answers to these questions give rise to the geometry of position, form, and size. These topics should be treated in such a way as to give the pupil some idea of geometric forms in nature, architecture, design, and the like.

Under the head of the geometry of size the pupil is introduced to simple problems of direct measurement and thus is led to understand simple algebraic formulas like $C=\pi d$, $A=\pi r^2$, $d=rt$, and the like. The need for a knowledge of evaluation of these simple formulas leads to such equations as $3l=12$, $n+4=10$, $c-5=14$, and $\frac{b}{2}=6$ whose solutions can easily be presented in the seventh grade.

In the eighth grade a little more than one half of a pupil's time should be given to a further consideration of intuitive geometry and to the fundamental applications of arithmetic, such as, problems of trade, banking, insurance, corporations, and the like. The remainder of the year should be given over to a study of algebra. It is better to continue the study of algebra which was begun in the seventh grade and to finish it in the ninth year than to condense all of the treatment in the ninth grade.

If a pupil ever uses algebra at all, his greatest need will be a knowledge of the formula. Here is where he gets his idea of what algebra means. Even if he doesn't use formulas, he must read with them. And so it is with the statistical and the mathematical graph. Moreover, if the pupil uses formulas at all, he will need to know how to solve the simpler types of equations. To these three important ideas we may add directed numbers as the fourth thing in algebra which the well-educated citizen should know.

In the ninth grade the course in elementary algebra should be completed and a unit of numerical trigonometry given. There is no question that intuitive geometry correlates well with both algebra and trigonometry. This can easily be done because the trigonometry is based on intuitive geometry and the pupil's previous knowledge of algebra. Moreover, there is to-day a clearer conception than formerly

of the nature of trigonometry and its relation to modern life. It gives the pupil a knowledge of indirect measurement in contrast to direct measurement where the measuring instrument is laid directly on the distance to be measured. It can be made so simple as to be much easier than many of the traditional algebraic topics, it is far more important, and it is more interesting to the pupils.

A short course in demonstrative geometry should be given so that the pupil will have a chance to find out what it means to prove something. This can be done with a few axioms, postulates, and theorems reinforced by some carefully planned work on original exercises.

It is clear that the junior high school course briefly described above is general mathematics in the best sense. With this basis it is possible in the tenth, eleventh, and twelfth years to give a glimpse into the more advanced parts of geometry, trigonometry, algebra, analytic geometry, and the calculus to those pupils who are able and interested enough to study further.

I have mentioned all of the various departments of the field of mathematics in some detail in order to emphasize at this time the importance of requiring that a teacher of mathematics in the junior high school be well grounded in subject matter.

A reasonable and a desirable requirement, which ought to be met by everyone wishing to teach mathematics in the junior high school, would be just such a course as I have described above, culminating in the Calculus. Of course, no one will teach calculus in the junior high school, but he will teach other material better if he knows what lies ahead. In other words, a teacher should know his subject as thoroughly as possible in order to have the proper background for his work. This is the first step in his preparation. In no other way can he be qualified to determine valid objectives.

In the second place, the teacher of the junior high school mathematics should be well trained in methods of teaching. This involves a knowledge of the various types of lessons, lesson planning, the art of questioning, and the like. It is clear that with all the success teachers in the junior high school have there is still room for improvement in methods.

In the next place, teachers should be encouraged to attend regularly the associations of mathematics teachers to which they should rightfully belong, to read the mathematics journals and yearbooks, and,

occasionally, to spend a few weeks in school to strengthen and renew their interest in mathematics. Nothing is of any more importance to-day in connection with the improvement of the curriculum than the training of teachers in service. It is sheer folly to spend a great deal of time reorganizing the curriculum unless at the same time the teachers of mathematics keep pace with the changes that are being made around them.

Implicit in all that I have said is the great need for better organization and understanding among mathematics teachers as a group. The junior high school teachers occupy an enviable position between the teachers of elementary arithmetic on the one hand, and the senior high school teachers on the other. Each group needs to know what the other groups are doing. All of these groups should be represented and kept vitally interested in any organized study of curriculum problems. To-day this is not the case. There is too much apathy and neglect of these important connections.

Finally, there is the need for wise and adequate supervision. Someone ought to discover what a supervisor does when he supervises. We have had a great deal of discussion of late about supervising, but very little real supervising is done. We need to spend less time on some of the mechanical and physical phases of school work and more on the ways of improving instruction.

It is only by the coöperation of all concerned—the superintendent of schools, the principal, the supervisor—on down the list to the humble classroom teacher that we may expect to achieve the great aim of the American public school system.

OBJECTIVE MEASUREMENT IN GENERAL SCIENCE

By SAMUEL R. POWERS
Professor of Natural Science, Teachers College

AS an instrument for measuring accomplishment and for predicting success in general ability the General Science Test has been developed. It has been prepared in two forms, Form A and Form B, each of which very closely approximates the same degree of difficulty. Each form consists of 100 items arranged as multiple choice statements.

The difficulty of each item has been computed by determining for each form the percentage of correct responses made to each item by 300 children. The most difficult item of Form A was answered correctly by but 9 per cent of the 300 children and the easiest item was answered correctly by 94 per cent. The most difficult item of Form B was answered correctly by but 5 per cent and the easiest item by 96 per cent. The items are uniformly distributed over the entire range of difficulty that lies between these extremes. The test has been designed especially for the grades of the junior high school, but it is adaptable for use on all grade levels in which general science is taught.

Teachers and supervisors of general science will find the test valuable for each of the following purposes:

1. It furnishes the pupil an objective measure of his accomplishment and of his standing in the group to which he belongs.
2. It furnishes a basis for comparison of accomplishment in different classes and for comparison of accomplishment in different schools.
3. It furnishes objective criteria for assigning marks, making promotions, reporting to parents, determining honors, etc.
4. A pupil's score on the test is in some measure a prediction of his ability to do successful work in specialized courses in science, such as the later courses in biology, physics, and chemistry.

5. The test will be useful in school surveys for studying the efficiency of a school.

The contents of textbooks and courses of study have been carefully analyzed in an effort to make the test valid for testing classes in general science. Approximately 1,000 test items were constructed, each of which was appropriate for testing some of the content revealed by the analysis. The 200 items used in the tests were selected from the list of 1,000, in part on the basis of experimental trial and in part on the basis of judgment of teachers experienced in general science.

Form	Cases	Measure Correlated	Coefficient
A	64	School Marks	.71 ± .04
B	63	School Marks	.59 ± .05
A	64	Regents' Marks	.68 ± .05
B	63	Regents' Marks	.67 ± .05
A	99	Intelligence Quotients	.52 ± .05
B	97	Intelligence Quotients	.57 ± .05
A	127	Intelligence Quotients	.47 ± .05
B	127	Intelligence Quotients	.56 ± .04

Statistical evidence of the validity of the tests for rating students is revealed from correlations with teachers' marks, marks on New York Regents Examination, and Intelligence Quotients. These are given in the table above.

School	Cases	Coefficients
1	171	.92 ± .01
2	120	.75 ± .03
3	86	.79 ± .03
4	95	.75 ± .03
1, 2, 3, 4	472	.85 ± .01

The coefficients of reliability have been computed from scores made by eighth and ninth grade children who have studied general science

for five periods a week throughout one school year. The coefficients show the correlation between the sets of scores made on Form A and on Form B. (See second table on page 346.)

The coefficient of .85 ± .01 may be taken as indicative of the reliability of scores on the test. The sigma deviation of the scores on each form is about 15 points. The probable error of a score on the test is calculated from the formula:

$$\text{P.E. (score)} = .6745\ \sigma\ \sqrt{1-r}.$$

Substitution of the above values in the formula (sigma = 15; $r = .85$) gives P.E. (score) = 3.8. It follows from this that the chances are even that the score which a student receives on one form of the test will not differ from his score on the other form of the test by more than 4 points.

Schools	Cases	Form A	Schools	Cases	Form B
1	171	66.7	1	171	64.0
2	121	47.7	2	120	51.8
3	88	45.8	3	88	45.6
4	99	52.8	4	97	46.6
5	69	45.9	5	48	53.1
6	99	44.2	6	93	45.4
7	94	44.5	7	80	45.5
8	—	—	8	118	41.7
9	42	39.4	9	—	—
10	64	47.7	10	63	50.7
11	34	44.6	11	—	—
Total	881	50.1	Total	878	50.0

It is not intended that students shall be limited in time allowed for the test. It has been found in experimental trial, however, that 35 minutes is adequate for each form.

Keys are used for scoring on which the items are numbered and spaced to correspond with the numbering and spacing of the items of the test. The numbers on the key indicate the correct responses and may be set alongside the responses which the student has made. The student's score is a total of the correct responses.

The norms are computed from the scores of 881 students on Form A and 878 students on Form B. The mean scores and cases for each of the schools which coöperated in the experimental use of the tests are shown in the table on page 347.

Without exception, the mean scores of the boys in different schools were higher than the means for the girls, although in some schools the differences were much greater than in others. The means on each form of the test for all cases of boys and girls are as follows:

	Form A	Cases	Form B	Cases
Boys	52.2	454	52.6	473
Girls	47.9	329	47.2	342

INTERPRETATION OF SCORES

Scores may be interpreted by comparison with the norms. The distribution of scores is indicated by the following tabulation:

	Form A	Form B
Lowest score	10	16
90% exceed	34	35
75% exceed	42	42
50% exceed	50	50
25% exceed	60	59
10% exceed	73	68
Highest score	95	95
Cases	881	878

When a student's score is 34 or less, it is evident that 90 per cent of the students whose scores were counted in determining the norms did better. If the score is 73 or more, it is evident that 10 per cent or less of the experimental group did as well. In general, students who receive high scores may expect to be rated as superior and may be encouraged to undertake further work in the elective sciences.

The distributions of scores on the two forms are so nearly the same that for practical purposes they may be considered identical.

The range of the median scores in the schools reported in a preceding table is, for Form A, from 39.4 to 66.7. It follows from this that more than 75 per cent of the 881 children who took the test scored higher than the median child in school number 9. The score for this school is therefore relatively low. This can be taken as evidence (it is not proof) that the work in general science in school number 9 is less efficient than that of other schools. On the other hand, the scores of more than 75 per cent of the 881 children who took the test are lower than the score of the median child in the school which scored highest (number 1 in table). This is evidence that the work in general science in this school is effectively given. With a single exception, the means are computed from ninth grade classes.

The author is pleased to acknowledge his indebtedness to the teachers who have coöperated with him in this work and especially to Mr. Elwood D. Heiss, of the Milwaukee State Teachers College, and to Mr. Clarence M. Pruitt, of Teachers College, Columbia University.

NEW STUDIES IN EDUCATION

EDUCATION AMONG THE METHODISTS BEFORE 1870*

The problem of this study was to determine:

1. The extensiveness of the movement for the founding of Methodist schools and colleges up to about 1870.

2. The relation of "Methodist" educational institutions to the Methodist Episcopal Church; the extent to which they were founded and directly controlled by the denomination, and the extent to which they were merely commended as worthy of patronage and support.

3. The attitude of the denomination toward the educational activities carried on under its name. Did it encourage them, or did it oppose them as a diversion of energies and resources which should be used to promote more strictly religious ends, and tolerate them only because it could not prevent them? Did it seek to use them for denominational and religious ends, or was such support as it gave the result of a genuine interest in and concern for education as such?

4. The nature of the Methodist educational institutions; the cost of building and maintenance, and the means employed to finance them; the size of the student bodies and faculties; the subjects taught, and the educational standards; the place of religion.

5. The attitude of the denomination toward the education of the ministry, and especially toward theological education.

For the earliest schools the main sources of data were the journals, histories, and other accounts by men who were familiar with these institutions. For the later schools, and for the attitude of the denomination toward education, the main sources of data were the denominational magazines, conferences journals and official records, and the records of the institutions themselves.

The study has made a contribution to the understanding of:

1. *The place of denominational influence in the development of education in the United States.*—One of the mooted questions of the day concerns the extent to which the religious ideal as represented in American Evangelical Protestantism is favorable to educational enlightenment. It is known that many, if not most of the secondary schools and colleges founded in the United States before 1870 were established under ecclesiastical auspices. But was this activity encouraged, or was it merely tolerated by the several denominations, and to what extent? If it was encouraged, to what extent were educational activities used merely to promote de-

* By Sylvanus M. Duvall, Ph.D. Teachers College, Columbia University, Contributions to Education, No. 284.

nominational or religious ends? This study, so far as the Methodists were concerned, shows:

a. Before 1830, few attempts were made to found schools, and these were of little significance, but between 1830 and 1870 the Methodists engaged extensively in educational activities, and established more than two hundred schools and colleges.

b. These activities were not the results merely of the zeal of individual Methodists. The denomination gave official encouragement and support, and the annual conferences themselves participated actively in the establishment and support of these institutions.

c. These schools and colleges were not founded primarily to promote denominational or religious ends, but resulted from a genuine desire to contribute to the educational life of the nation. The relinquishment by certain Methodist groups of the control which they had exercised over institutions which they had founded and maintained, is in harmony with the historical traditions of American Methodism.

2. *The attitude of the Methodist Episcopal Church toward the education, and especially the theological education of their ministry.*—Compared to the careful attention given to the education of their ministry by such groups as the Presbyterians and the Congregationalists, the education of the Methodist ministers was neglected. In sharp contrast to the encouragement and support given to general education, theological education was frowned upon by the denomination, and in some instances, bitterly opposed. It won a place slowly, mainly because of vigorous support of the more advanced leaders of the Church. This support of theological education centered in New England.

3. *The contributions of the denominational college to the moral and religious life of the nation.*—While moral and religious training was by no means neglected, the curriculum of these Methodist institutions centered about what have traditionally been called the cultural subjects, such as the classics and mathematics. The Bible had almost no place in the curriculum. In so centering their efforts, denominational colleges have failed to make the unique contribution which they might otherwise have made to the moral and religious life of the nation.

4. The schools of the period studied; their cost; the means employed to finance them; their curricula, faculties, student bodies, and educational standards; and such phases of the history of education as the manual labor movement and the education of women.

LEARNING OF BRIGHT AND DULL CHILDREN*

Four groups of fifteen children each, nine and twelve years of age, groups differing in mental level on the basis of the individual Binet test, performed five days of individual work on seven learning tasks: mirror drawing, substitution, inducing a rule, reproduction, shorthand and formboard.

Statistical treatment of the data showed (1) that on the average, selection by the Binet test fairly well assured the quality of performance on certain

* By Frank T. Wilson, Ph.D. Teachers College, Columbia University, Contributions to Education, No. 292.

tasks requiring responses of like character, viz., largely mental, but gives less and less assurance of the quality of performance on other tasks requiring greater and greater proportions of gross muscular responses; (2) that for individuals, selection by the Binet gives only slight assurance of the quality of performance on any of the tasks, but that for work involving a greater proportion of gross muscular movement the prediction is more uncertain than for that largely mental. It is concluded that the nature of the responses required in the performance of a task enter, along with the age, brightness and physical maturity of the individual as determiners of the results achieved. The most clearly effective factor or group of factors in the nature of the various tasks seems to be gross muscular movement involved.

Other factors undoubtedly enter into the quality of performance. The data seem to show that something, perhaps included under the general term "novelty," affects results in proportion as it enters into the tasks which are not very well determined by the more effective factors included under the category of gross muscular movement.

The study suggests the practical value of analysis of typical learning tasks to reveal the nature of responses involved and the economical location of their learning in the development of young people. Brighter individuals seem to have that kind of ability to make economical progress in work requiring a small proportion of gross motor movement. Dull individuals seem to possess that kind of ability which makes economical progress in work which requires a large proportion of gross muscular movement.

ORGANIZATION OF THE REQUIRED PHYSICAL EDUCATION FOR WOMEN IN STATE UNIVERSITIES*

This study should contribute toward the solution of such problems as:

1. The formulation of standards for judging departments of physical education for women in colleges and universities.

2. The formulation of a guide for the organization of typical departments and for the organization of departments now rendering only a limited service.

One method of investigation has consisted of a personal visit of two or three days to each of fifteen colleges and universities selected from the group which is accredited by the American Association of Colleges and Universities. These institutions range in size of student enrollment from 963 to 11,171; in size of faculty from 87 to 1,077. They are representative of the intermountain section, of the Middle West and of the East.

During each visit, previously formulated questions were asked of the head of the department of physical education, the directors of physical education for men and for women, the director of student health service, the chairman of the general committee for the promotion of student health, and the business officer of the institution. Two objectives controlled the formulation of these questions:

* By Georgia B. Johnson, Ph.D. Teachers College, Columbia University, Contributions to Education, No. 253.

(1) to ascertain present practice in regard to departmental organization of the required physical education for women in colleges and universities, and

(2) to secure an expression of expert opinion based on the experience of those who are in immediate control of the situation in each case.

Study was then made of the scientific research in allied fields and of present practice in other academic departments which appeared to be pertinent to the investigation. Thus two bodies of information were available,—present practice and literature dealing with the subject. From these two sources two or more alternatives were derived concerning each phase of the organization program.

These alternatives were then presented for evaluation to ten men and women who were rated as "expert" in the field of physical education in the following manner: The directors of physical education for women and for men in each of the fifteen colleges studied were asked to write the names of the ten persons, men and women, whom they considered most outstanding in the field of physical education. From the list thus submitted were selected the ten persons who received most frequent mention and these persons were asked to indicate which of the alternatives in each case appeared to them to be most desirable without consideration of any particular situation.

Upon the basis of these evaluations a plan is suggested for the organization of the required courses in physical education for women in State Universities.

Among the facts revealed by the study are the following:

1. That the aims of physical education are not yet fully established.

2. That the optimum amount of physical education to be required for graduation from a State University is more than double the amount which is required at present.

3. That a minimum number of hygiene lectures together with a maximum number of individual health conferences is considered the most effective method of teaching hygiene.

4. That an elective program of physical education meets the needs of the individual and of society more adequately than does a program of corrective and remedial gymnastics.

5. That the women in physical education have more thorough academic training than have the men.

6. That the director of physical education should be trained in general education as represented by the degrees Bachelor of Arts, Master of Arts, Doctor of Philosophy, rather than in medicine.

7. That health teaching and supervision and physical education which, until recently, have been included in the program of one department, are more effectively administered by two separate departments.

8. That complete separation of the departments of physical education for women and for men allows greater opportunity for the development of the program of physical education for women.

9. That men in physical education rank higher than do the women.

10. That teachers' estimates, although used to a great extent, are inadequate measures of students' innate physical efficiency and of their motor abilities and accomplishments.

11. That there are fewer non-ranking officers of instruction in the department of physical education than in the departments of English, Psychology, History and Chemistry.

FACTORS AFFECTING THE DISTRIBUTION OF TRAINED TEACHERS IN THE RURAL WHITE ELEMENTARY SCHOOLS OF NORTH CAROLINA*

North Carolina in 1920 adopted a state-wide minimum salary schedule varying with the training of the teacher and embodying the "single salary" feature. An examination of data relative to the training of the teachers in the rural white elementary schools revealed the fact that certain schools have relatively poorly trained teachers and others have relatively well trained teachers.

One purpose of this investigation was to find the significant conditions surrounding schools which cause some of them to have teachers with a large amount of training and others to have teachers with a relatively small amount of training. A second purpose was to apply the findings of the study to the solution of several problems in the field of state school administration.

Out of one hundred counties of the state thirty were selected at random, giving a total of 1,393 schools. From documents on file in the office of the State Superintendent of Public Instruction and from various U. S. Government publications, measures for eleven tentative factors were derived. The techniques of partial and multiple correlations were used in determining the relative significance of these eleven factors. Four measures were found to be representative of conditions affecting the distribution of trained teachers, viz: monthly salary, the expenditure of local funds to enrich the minimum state program, number of elementary teachers in the school, and length of term.

The factors affecting the distribution of trained teachers having been determined as stated above, this information was applied to the study of four problems related to the state administration of schools. The conclusions reached in this phase of the investigation may be summarized as follows:

1. The salary schedule has been very effective in operation. The purpose of the salary and certification laws—viz, to coördinate the salary of the teacher with her training—has been realized in practice.

2. There has been an improvement in the training of the rural elementary teacher since the enactment of the single salary law. Although the facts presented do not prove that the single salary feature is the cause of this improvement, they show that this is probably the case.

3. There are certain theoretical objections to the use of the cost of teachers' salaries under the schedule as the measure of educational need and as a basis for the distribution of the equalization fund. These theoretical objections to the present method will be outweighed by practical considerations provided the present glaring inequalities in the distribution of trained teachers are equalized.

4. An equalization of the opportunity to get trained teachers may be brought about by enriching the state minimum program along three lines: (*a*) increasing the length of term; (*b*) encouraging the consolidation of schools; (*c*) revising upward the present salary schedule. Spe-

* By John W. Carr, Jr. Teachers College, Columbia University, Contributions to Education, No. 269.

cific recommendations for enriching the state minimum program along these lines are given.

Most of the conclusions and recommendations of the study apply mainly to the present situation in North Carolina, but school administrators in other states, considering the adoption of minimum salary schedules, may find this study of conditions in North Carolina helpful in that it shows the possibility of the success of a state-wide single salary schedule in operation, reveals certain defects of the North Carolina law which should be avoided in future experiments, and suggests a valid technique which can be used for setting up and revising salary schedules.

THE EVOLUTION OF THE CONNECTICUT STATE SCHOOL SYSTEM WITH SPECIAL REFERENCE TO THE EMERGENCE OF THE HIGH SCHOOL*

THE purpose of this study was to discover the origin of the high school in Connecticut and to trace the course of its emergence in the several communities. In order to produce a thoroughgoing treatment of the subject it was found necessary to go back to the very earliest legal enactments bearing upon schools, beginning with the famous Code of 1650. What has resulted is a detailed account of the evolution of the Connecticut state school system, culminating in exhaustive attention to high school development.

Pertinent educational conditions during the successive periods considered have been reconstructed from contemporaneous documents. Practically every statement made is founded upon scrutiny of original papers. Literally thousands of pages of hand-written school reports and scores of manuscripts besides, dealing with individual institutions and situations, have been located and many important facts elicited from them. Over one thousand issues of early Connecticut newspapers, including ten complete annual volumes of a weekly journal between 1830 and 1840, were closely perused for supporting testimony. The archives of the Connecticut State Library and of the Division of Research of the Connecticut State Board of Education at Hartford yielded a wealth of corroborative evidence.

The essential characteristic of the unfolding of the scheme of education in Connecticut has been the process of adding new instructional offerings at the top of the regular district school courses as need has arisen to supply more advanced studies for older pupils. Under the "local option" situation affecting provisions of high school instruction in Connecticut towns, high school studies have been introduced into the numerous district schools from time to time and separate upper departments have come into existence at random over the State as interest has been aroused by the friends of education and necessity for such advanced education has been publicly felt in individual localities.

The conception of an institution of a higher order approaching in nature the modern American secondary school was formulated as early in Connecticut as in any other quarter. A minute examination of the Connecticut law of 1798, permitting and describing "a School of a

* By Orwin Bradford Griffin, Ph.D. Teachers College, Columbia University, Contributions to Education, No. 293.

higher order," has revealed this enactment to be so clear-cut a step in the evolution of the high school as a distinct entity that it might with perfect propriety be denominated "the first American high school law," antedating by a generation the so-called Massachusetts high school law of 1827.

From this rudimentary form of a "higher order" school no perceptible development was experienced until the period following Henry Barnard's dedication of himself to the cause in 1837. Barnard's Independence Day address of 1838, setting forth a definite plan for gradation of schools into primaries for children four to eight years of age, intermediates for those eight to twelve, and high schools for boys and girls from twelve to sixteen, marks the opening of the high school era in Connecticut education. This lecture, repeated at school conventions and on other occasions in the larger cities, disseminated the idea of the organization of upper grades as a unit for the advanced instruction of older pupils and led to spirited meetings in various centers at which action was taken which eventuated in the establishment of many high school departments. The history of the entire movement is spread on the pages of the present volume, which educational statesmen will find to contain a mass of material to guide them in forming judgments with reference to both immediate and future problems of the American secondary school.

Thus the historian of education must chiefly justify himself, by an accumulation of voluminous evidence on the basis of which sound prophecies of future trends may confidently be predicated. This new study has brought together for the first time in comprehensive fashion all the essential data dealing with public education in Connecticut. The feature which to-day crowns the whole structure of that gradual, logical development is this institution called "the high school." In the light of its ancestry and in the face of its present status no one can safely assert that it constitutes a crystallized organization. Simply it represents to-day's answer of the American people to the question, How far shall our children be educated at public expense? Broadly interpreting the entire sweep of facts disclosed by this investigation, we are irresistibly brought to the conclusion that to-morrow's response will be the junior college. The ominous cloud of the mounting costs of public education will check for a space the advent of the junior college, but the future will witness its widespread acceptance in the typical state of Connecticut, and in other states, and its vogue comparable to that now enjoyed by the high school. The coming of this new institution will but mark the next logical step in the upward extension of the American public school system.

AN ANALYSIS OF THE DOWNEY WILL-TEMPERAMENT TESTS *

SINCE the Downey Individual Will-Temperament Test was published in 1919, three group forms have been prepared. They are (*a*) The Downey Group Will-Temperament Test, (*b*) The Carnegie Adaptation of the Will-Temperament Test, (*c*) the Non-Verbal Will-Temperament Test. All purport

* By Richard Stephen Uhrbrock, Ph.D. Teachers College, Columbia University, Contributions to Education, No. 296.

to measure the same traits tapped by the Individual Test. The first two use verbal material. The third depends upon pictures and designs, and was prepared for use in the study of racial differences.

The present investigation represents an attempt to do seven things:

1. Determine the self-correlations for the sub-tests of the three group Will-Temperament Tests.
2. Determine the cross-correlations for test parts, in the Individual and the three group Will-Temperament Tests, bearing the same names, and designed to measure the same functions.
3. Establish a general criterion for "Speed of Movement," "Speed of Decision," and "Motor Inhibition" for the purpose of showing the extent to which the specific tests in the Will-Temperament series may be measures of general functions.
4. Test the validity of the trait measures by means of the method of estimates, i.e., ratings on a specially prepared five-step scale.
5. Correlate the scores for the sub-tests in the four Will-Temperament Tests, with a measure of general intelligence, e.g., McCall's Multi-Mental Scale.
6. Correlate the scores for the sub-tests with school grades earned in June, 1926.
7. Bring together in one source a complete review of the literature and experiments relating to the Downey Will-Temperament Tests.

One hundred fifty-one junior high school boys, with a median age of 14.2 years, served as subjects for the group testing program. One hundred thirteen of the group were tested individually to secure data to establish general criteria for "Speed of Movement," "Speed of Decision," and "Motor Inhibition."

The self-correlations for the parts of the Rating Scale ranged from + .43 to + .89. In the Downey Group Will-Temperament Test, the self-correlations for the sub-tests ranged from + .12 ± .06 for "Self-Confidence" to + .89 ± .02 for writing the name as rapidly as possible (Test II-2). The average self-correlation was + .50 ± .04. For the Carnegie Adaptation of the Will-Temperament Test, the range was from + .20 ± .06 for "Freedom from Inertia" to + .83 ± .02 for writing the phrase "United States" as rapidly as possible (Test 4). The average self-correlation was + .54 ± .04. The self-correlations for the parts of the Non-Verbal Test ranged from + .24 ± .06 for "Eye-Hand Coordination" to + .71 ± .03 for "Drive." The average was + .45 ± .05.

The correlations between test scores, ratings, intelligence, and school grades were uniformly low, or negative. The average correlation with ratings was + .034; with intelligence, + .063; and with grades, + .030. Correlations between individual tests and composite criteria for "Speed of Movement," "Speed of Decision," and "Motor Inhibition" were low enough to warrant the statement that no single test studied may be accepted as an adequate measure of the general function it was assumed to represent.

To summarize: (*a*) there is little evidence, on the basis of rating scale results, that the traits have been named correctly; (*b*) the traits measured, regardless of their names, are non-intellectual in character if we accept the McCall Multi-Mental Scale as a measure of general intelligence; (*c*) the sub-test scores do not show significant correla-

tions with school grades; (*d*) the reliability of the sub-tests varies over a wide range, depending upon the length of the test and the degree to which the motor habit involved has become automatic.

The practical applications of the present study are fourfold. (1) A complete review of the literature and experiments in the field of Will-Temperament Testing has been presented. (2) The relationships between Will-Temperament Tests, ratings, intelligence scores and grades have been re-investigated, and previous findings confirmed. (3) A careful study has been made of the sub-tests designed to measure "Speed of Movement," "Speed of Decision," and "Motor Inhibition." The relative value of the Downey material, as compared with certain other test forms, has been roughly determined. (4) Finally, data have been accumulated and reported which will serve as guides for other investigators interested in this type of testing.

THE JUDICIAL POWER OF THE NEW YORK STATE COMMISSIONER OF EDUCATION—ITS GROWTH AND PRESENT STATUS*

CAN a left-handed child be legally compelled to write with his right hand? Are a teacher's activities as a citizen, e.g., membership in the Communist party or picketing for a political principle, inconsistent with her rôle as teacher? Can the principal of a school legally insist on the right to supervise a school publication? Can a board of education be compelled to give the use of a school auditorium for the discussion of "old-fashioned free speech"? Can a board of education ignore the recommendations of a superintendent of schools as to the appointment of teachers? Can a board of education dismiss a teacher because of marriage or maternity? These and numerous other issues sketchily indicate the discords in New York State's educational symphony which the Commissioner of Education is constantly being called upon to reduce to harmony. To bring this judicial aspect of state educational administration more to public attention and to digest the thousands of decisions in New York State for popular use has been the object of the present study.

The first chapter gives the general background and context necessary for viewing this judicial power in its proper perspective. It is seen that the nineteenth century in New York State witnessed a tremendous expansion of legislation in the fields of social welfare, e.g., health, banking, agriculture, labor, etc. Very naturally this development involved the state in intensely technical questions of economics, sociology, and kindred fields of expert knowledge. Settlement of disputes in these fields obviously requires technically rather than judicially trained minds. Nowhere is this more true than in the field of education. New York State first began to recognize this fact in 1822 when it conferred judicial power on the Secretary of State, the then Superintendent of Common Schools.

The second chapter of the study describes the manner in which justice is administered by New York State's chief

* By John S. Brubacher, Ph.D. Teachers College, Columbia University, Contributions to Education, No. 295.

educational expert, the Commissioner of Education. What complaints are cognizable by the Commissioner and who may complain to him are among the first items considered. Later, the procedure to be observed in bringing appeals is outlined. The enforcement of decisions receives separate attention. The relation of the Commissioner's administration of justice to that of the regularly constituted courts requires several sections for exposition. Here the weight and importance to be accorded the Commissioner's decisions are brought out by the fact that, save for a few exceptions, his decisions are not subject to review in any place or court whatsoever. Here also is considered how the Commissioner of Education unites in one person both judicial and executive functions, a union quite contrary to the American tradition of separation of powers and a new precedent in our political science. Finally, a sketch is given of the growth in the State Education Department of a bureau which is specially charged with the keeping of the judicial conscience of the Commissioner.

The third chapter, occupying the major portion of the study, is taken up with a collection and critical digest of all the available decisions which the Commissioner has handed down during the century of his judicial activity. Merely to hint at his holdings on the manifold variety of controversies appealed would, of course, require more space than can be commanded here. A few typical issues were detailed above at the outset of this digest. Others involve controversies concerning the consolidation of school districts in all its aspects, transportation of pupils, religious instruction in the public schools, all angles of teacher contracts, teacher certification, discipline of pupils, the curriculum, methods of instruction, etc.

The last chapter attempts a critical review of past and future tendencies. The social desirability of establishing the Commissioner as a judicial tribunal is affirmed on the basis of his past successes in that capacity. Certainly little doubt can be expressed but that the power so placed in his hands has been tremendously important in raising education to its present position of preëminence in New York State.

COLLEGE NEWS

EDUCATIONAL ADMINISTRATION

Dr. George D. Strayer made his initial trip on the work of the Florida Educational Survey, November 14 to 23, inclusive. On December 3, Dr. Strayer, Dr. N. L. Engelhardt, and a group of twelve students left for a two weeks' trip to Florida to study the problems of General Administration, Business Administration, Buildings and Equipment, and the like.

The following members of the Staff of Teachers College are participating in the work of the Florida Educational Survey which is being directed by Professors Strayer and Engelhardt; Director R. J. Leonard, Professors W. C. Bagley, M. B. Hillegas, E. S. Evenden, Carter Alexander, Paul R. Mort, Mr. W. S. Elsbree, and Mr. W. D. Cocking.

Professor Paul R. Mort is acting as adviser to the Pennsylvania State Commission to study the Distribution of State Subsidies to School Districts.

Professor Strayer addressed Section Q of the American Association for the Advancement of Science at Nashville on December 27. His topic was the "Present Status and Outlook in the Scientific Attack on Problems of Educational Administration."

Professor Mort and members of the First Major course for Superintendents of Schools spent November 10, 15, and 22 in Closter, N. J., working on the classification and testing part of the survey.

Professor Mort spent the week of November 28 in Florida, working on the state support aspect of the Florida Survey.

BUREAU OF CURRICULUM RESEARCH

Many new courses of study in the elementary, junior and senior high school fields have come to the files of the Bureau of Curriculum Research since January first. A study has been going forward in which these courses have been considered for curriculum merit. Results of this study will appear in a bulletin which should be off the press in December or January. This bulletin will contain a list of those courses judged to be outstanding in each field of subject matter in the elementary and junior high schools, as well as the tendencies and some of the chief features of the selected courses.

Another study which has been going forward for some time is concerned with the treatment of individual differences in courses of study. Results of this study will be contained in a bulletin which will also be published this winter.

The Southeastern State Teachers College at Durant, Okla., has inaugurated

a rather unique and interesting experiment in coöperative course of study construction. Twenty-two communities in the district are attacking the problem. The schools of these communities range from one-room rural schools to a city school system employing some 150 teachers. There are twelve communities with populations between 2,500 and 5,000. The Teachers College at Durant has established a curriculum library and laboratory and is acting as a clearing house for the materials needed by the various course of study committees. Dr. Herbert B. Bruner, of the Bureau of Curriculum Research, who has been employed as consultant for the program, spent a week in Durant during September and plans to make three other visits during the year 1927-1928. When one takes cognizance of the fact that less than 2 per cent of the 19,000 courses of study on file in the Bureau of Curriculum Research come from communities of a population of less than 10,000, the Durant program assumes a significance that will warrant the putting forth of some very real efforts.

Following the survey of the Beaumont, Texas, Public Schools made by the Division of Field Studies of Teachers College, the Board of Education and Superintendent M. E. Moore have inaugurated a program of curriculum reconstruction. Dr. Bruner, who has been asked to advise on this program, spent September 15 to 19 in consultation with Superintendent Moore and the supervisors, principals, and teachers of the Beaumont Schools.

Miss Florence Stratemeyer and Dr. Herbert B. Bruner have made two visits each to Coatesville, Pa., in connection with the course of study reconstruction program there which is now entering its second year. The reports of last year's work of each of the twenty-five committees have been evaluated in the Bureau of Curriculum Research and suggestions have been made regarding their revision. An extramural course is offered by Teachers College in connection with this program in which several of the subject matter specialists of Teachers College participate.

EDUCATIONAL PSYCHOLOGY

Professor Mary T. Whitley spoke in November at the New Jersey State Convention of Religious Education held in Newark, where she also conducted a discussion group on the religious aptitudes of little children.

The class in Child Psychology is preparing, under Miss Whitley's direction, to investigate further in the matter of children's interest in making collections, stimulated thereto by the recent rather negative findings of Lehman and Witty.

Early in December Professor Whitley addressed a teachers' club in Plainfield, N. J., on the treatment of fear in childhood. In December she also conferred with the parents' club of a large private school on the topic of sex education.

EDUCATIONAL SOCIOLOGY

Professor David Snedden was one of the speakers at the Forty-second Annual Convention of the New Mexico Educational Association, held at Albuquerque, New Mexico, November 3, 4, and 5.

On October 24 about one hundred students of Teachers College attended an

organization meeting of the Educational Sociology Club. Short addresses were made by Professor Snedden and Professor Daniel H. Kulp, and by Mr. Hayes, former president of the club. Officials for the year were elected, as follows: President, Amelia Bengston; Treasurer, Ruth Schad; and Publicity Secretary, Helen Bingham.

On November 5 the Club introduced its season's program by making a regional survey of the Island of Manhattan.

The Educational Sociology Club on Election Day, November 8, took an all day trip by automobile to Letchworth Village, Thiells, N. Y., and returned by the way of Bear Mountain Park, Tarrytown, and the Bronx River Parkway.

ELEMENTARY EDUCATION

Professor Annie E. Moore addressed the Kindergarten-Primary Section of the Maine Teachers Association at Portland, Maine, October 28. Her subject was "An Activity Curriculum in Kindergarten-Primary Grades." She also gave a brief talk at the dinner given by the Kindergarten group that evening.

On Friday, October 28, Dr. Edwin H. Reeder spoke at two sessions of the Connecticut State Teachers Association, Middle Grade Section. The morning meeting was in Bridgeport and the afternoon meeting in New Haven. The Middle Grade Section of the State Teachers Association devoted its meetings to a discussion of visual education and the topic discussed by Dr. Reeder was "The Place of Reality in Instruction."

On Friday, November 4, Dr. Reeder addressed the meeting of the New York State Teachers Association at Rochester on the subject of "Common Sense in Problem Teaching in Geography" and on November 18 he spoke at the New York Meeting of the Association, Visual Education Section.

FINE ARTS

Professor Albert W. Heckman addressed the art teachers of the New York City Public Schools at their November meeting on the subject of Art Appreciation and Creative Work. Professor Heckman also spoke to the staff of the Evander Childs High School on November 15 on "Planning a Course of Study in Art Appreciation."

Miss Lucia Dement is conducting an extramural course in Yonkers, N. Y., for kindergarten and first-grade teachers.

Mr. Charles B. Upjohn is conducting a class in modeling and pottery at the Ethical Culture School and is obtaining excellent results from the high school.

The British Museum has recently exhibited a collection of American etchings and woodcuts among which were prints by Mr. Arthur R. Young. A woodcut and a linoleum print from the collection were purchased by the Museum to be added to the permanent collection.

Miss Elise Ruffini is now booking people for her annual summer trip to Europe. This year her tour will include Prague, where the International Congress of Art Teachers will convene the first week in August.

HOUSEHOLD ARTS EDUCATION

Professor Anna Cooley has just returned after a week's absence attending

the district meetings of the Home Economics Association of New York State. She spoke at Rochester and at the Buffalo meetings. She also visited Syracuse and Geneva College in the interest of Home Economics state work.

Professor Wilhelmina Spohr attended the annual meeting of the Southern District of the New York State Teachers Association at Elmira, November 18. She addressed the Home Economics section on "Setting Up Learning Conditions for Home Economics Students in High Schools."

Miss Grace Reeves addressed the Massachusetts State Home Economics Association in Boston, October 28. Her subject was "Home Economics in Foreign Lands."

Miss Reeves is giving an extramural course to home economics teachers of Elizabeth, N. J. It consists of a demonstration lesson followed by a discussion of the lesson and various teaching problems. About thirty are enrolled in the course.

The Household Arts Education Staff members entertained the students of their classes at an informal party in Grace Dodge Room on Wednesday, November 16.

Tuesday, November 8, Dr. and Mrs. Benjamin Andrews of Edgewater, N. J., were host and hostess to the members of the Helen Kinne Club at a delightful outdoor picnic.

The officers of the Helen Kinne Home Economics Club for 1927-28 are: President, Cleora Helbing; Vice President, Mary Beeman; Secretary, Camilla Mills; Treasurer, Isabel Young.

INDUSTRIAL ARTS

Mr. Gordon Grant is engaged on a part-time basis in teaching industrial arts and related subjects in the Ridgefield School of Ridgefield, Conn.

Miss Jane B. Welling, who has been supervisor of industrial arts and fine arts in the elementary schools of Toledo, Ohio, is now doing similar work in Detroit, Mich.

Miss Rose B. Knox is the author of a book recently issued by the Houghton Mifflin Co., called *School Activities and Equipment.* While of general value to elementary school teachers for nearly all subjects, this book is of especial significance for the teaching of industrial arts.

Professor Wm. E. Warner of Ohio State University is on leave of absence for two quarters. He is spending the time at Teachers College in organizing and preparing for publication the results of an extended study of the needs and policies of a teacher-training program in industrial arts education for Ohio.

Mr. Charles R. Partrick is editor of a good series of Individual Self-Instruction Project Pamphlets in industrial and household arts. These are published by the Practical Arts Publishing Co., 44 Vista Avenue, Elizabeth, N. J. Nineteen project pamphlets have been issued and others are in preparation. Some are for boys and some for girls—all of such character as to be well adapted to junior high school or upper grade years.

INTERNATIONAL INSTITUTE

The Fundamental Course on American Education which the International Institute has organized for students from foreign lands is the largest in its history. Eighty students and teachers from twenty-seven countries are enrolled. The majority of the group are experienced administrators, supervisors, and teachers. The following list shows the variety of educational positions held by the members of the group: State Director of Vocational Education, Poznan, Poland; Inspector of Schools, Orissa Division, India; Assistant Director of Rural Education, Haiti; Secretary of the National Union of Secondary School Professors, Budapest, Hungary; Supervisor of Schools, Honduras, Central America; Principals of Piu Ching Academy, Canton, China; Principal of Training School, Travancore, India; Supervisor of Secondary Schools, Peking, China; Supervisor in Normal School, Honolulu, Hawaii; Principal of Secondary School, Laguna, P. I.; Professor of Higher Normal School, Tokyo, Japan; Professor of State Normal School, Minas, Brazil; Lecturer on Academy of Economics, Bucharest, Roumania; Professor, Tainan College, Formosa, and Professor in Normal School, Capiapo, Chile.

Among the members of the group are elementary teachers from China, India, Porto Rico, Chile, Haiti, and Brazil; and secondary and normal school teachers from the Philippine Islands, Bulgaria, China, India, South Africa, Argentine, Chile, England, Scotland, Japan, Germany, Korea, Hungary, Brazil, Honduras, Egypt, Esthonia, France, Austria, Italy, Russia, and Czechoslovakia.

Under the direction of Dr. Milton C. Del Manzo, who is in charge of the course, provision has been made for an extensive program of school visitation. Thus the course is made to include direct observation of American educational institutions and practices as well as a study of American theory of education. To those school officials and teachers who have made these visits possible the International Institute is greatly indebted. To date the following schools and institutions have been observed: Elementary schools of Hackensack, N. J.; Kindergarten of Teachers College; John Hancock Elementary School of New York City; Longwood Avenue Elementary School, New York City; Baltimore County Schools, Maryland; State Normal School, Towson, Md.; National Education Association, Washington, D. C.; United States Bureau of Education, Washington, D. C.; Federal Bureau of Vocational Education, Washington, D. C.; Pan-American Union of Washington, D. C.; American Red Cross Headquarters, Washington, D. C.; Hampton Institute, Hampton, Va.; and South Philadelphia High School for Girls, Philadelphia, Pa.

THE LINCOLN SCHOOL

The two October issues of the *Hamburger Lehrerzeitung,* one of Germany's foremost school journals, were given over to a discussion of the Lincoln School, its practices and philosophy. Miss Margaret Holz, on leave of absence from the German department of the Lincoln School, gave a series of four addresses to educators, parents, and students of the Hamburg schools.

Dr. Jesse H. Newlon, Director of the Lincoln School, spoke before the Essex

County Teachers Association in Boston on November 3.

Mrs. Ethel H. Bliss spoke on November 2 at a meeting in Staten Island for the organization of a "Progressive Pre-School Group."

Miss Lula Wright has an article, "Creative Expression in Language," in the October number of *Childhood Education.*

Dr. Otto Koischwitz of the German department gave an address, "Die Uberwindung der Neuromantik," on November 17, before the Verband deutscher Schriftsteller und Literatur freunde." He has an article on "Die Legende von Herren" by Walter von Molo in *Annalen,* Schweitzer Monatschrift.

MATHEMATICS

Dr. David Eugene Smith, Emeritus Professor of Mathematics, spoke at the American Museum of Natural History on November 25 at the exercises commemorating the bicentenary of the death of Sir Isaac Newton. Professor Smith served as chairman of the committee in charge of these exercises. Professor Smith also spoke on November 18 before the New York State Teachers Association on "The Teaching of Geometry."

Professor W. D. Reeve and Mr. H. C. Christofferson both spoke on November 26 at the meeting of the Association of Teachers of Mathematics of the Middle States and Maryland held at Atlantic City.

At the November meeting of the Mathematics Club of Teachers College, Professor George S. Counts, associate director of the International Institute, gave a very interesting talk on "Education in Russia." Professor Counts recently spent considerable time in Russia visiting all types of educational institutions.

This year the Department of Mathematics is offering courses for teachers in service on Saturday afternoons as well as on Saturday mornings. The Saturday afternoon offering includes courses in "Field Work in Mathematics" during the first semester and "A Laboratory Course in Junior High School Mathematics" during the second semester, both courses being given by Mr. Carl N. Shuster. There is a large enrollment in this work as well as in the Saturday morning courses.

MUSIC EDUCATION

The Music Education students are continuing the efforts of the Summer Session group to raise funds for a scholarship in the National High School Orchestra Summer Camp. The group last summer was the first one to assume the responsibility for sending one qualified high school student to the Camp which is to be held in northern Michigan under the direction of Mr. Joseph E. Maddy, who has for two years been on our summer school teaching staff.

Under the auspices of the Music Club the Volendam Trio, consisting of Mme. Neke Hildebrandt, Mme. Betsy Culp, and Mr. Louis Dornay, gave a program of Dutch folk songs in the Horace Mann Auditorium on the evening of November 7. The charm of the music, the quaint Dutch costumes, the short but lucid explanations given by Mr. Dornay, and especially the remarkably dramatic power

of both Mme. Hildebrandt and Mr. Dornay produced an entertainment which was received with great enthusiasm by the large audience.

The Teachers College Women's Glee Club, under the direction of Professor Alice E. Bivins, gave a brief concert in the entrance to Russell Hall one noon in November and made a most favorable impression.

The first of recitals by advanced students in the Music Education Department was given on Wednesday, November 16, when Mr. William Breach sang three groups of songs, and Mr. Benjamin Swalin played two groups of violin solos. The high artistry of these students produced an excellent concert.

The Music Education Department contributed to the Friday Chapel exercises at Thanksgiving time by presenting the following program: "Aria" (string ensemble), Antonio Tenaglia; "Die Almacht" (vocal solo), Shubert; "Magic Flute" (small orchestra), Mozart; "Andante Cantabile" (violoncello solo), Goltermann; "Largo" (from New World Symphony) (small orchestra), Dvorak. The Women's Glee Club contributed special Thanksgiving music at the Wednesday Chapel exercises.

Mr. N. L. Church presented the claims of music as an extra-curricular activity in Professor Fretwell's class, and also spoke before Mr. Atkinson's group of workers in boys' clubs. The latter address led to the request for men to take charge of music in several of the New York boys' groups. There is such a demand for this work that practically all the men who are specializing in instrumental music are earning the larger share of their college expenses by doing some teaching in their free hours. A number of the women teachers are also doing part-time music teaching in clubs and private schools.

During December Professor Peter W. Dykema appeared on the program of the Music Teachers' National Association at Minneapolis. He presented two papers: one, "A Discussion of the Significance for Future Music Education of the Present Scientific Approach," and the other, "The Annual Report of the Committee on Community Music."

The Christmas celebration which has become traditional at Teachers College was again largely in the hands of the class in song leading and community music, and the Music Club. At the time of writing these notes, tentative plans include almost a full week of Christmas music for the general student body, and a special afternoon and evening with a banquet for the Music Education students.

NURSING EDUCATION

Professor Lillian A. Hudson represented the Nursing Education Department at the American Public Health Association meetings in Cincinnati, October 17 to 21. Professor Elizabeth C. Burgess attended the annual meeting of the New York State League of Nursing Education and Miss Mary B. Hulsizer attended the meetings of the State Nurses Association held at Rochester, N. Y., October 24 to 27.

Miss Mary B. Hulsizer gave a paper, "School Nursing and the Signs of the Time," on October 17 before the Wel-

fare Federation of the Oranges, Orange, N.J.

Miss Katherine Faville gave an address before the Massachusetts State Association of Board Members of Public Health Nursing Associations in Boston, Mass., November 16 on "An Adequate Program for a Small Nursing Association."

Professor Lillian A. Hudson visited the Cattaraugus County and Syracuse City Health Demonstrations as a representative of the Milbank Advisory Committee on Nursing.

Miss Mary M. Marvin discussed the subject of "Supervision in Schools of Nursing" at three sessions of the Instructors' Section of the Institute of the Pennsylvania State League of Nursing Education held at Erie, Pa., October 27-29, 1927.

Miss Katherine Faville has been appointed part-time instructor in Public Health Nursing. Miss Faville is a graduate of the Massachusetts General Hospital School for Nurses, 1921; Bachelor of Science, University of Wisconsin, in 1915; Master of Science, 1916. She has served under the American Red Cross as County Public Health Nurse in Michigan, as Supervisor of Public Health Nurses in Wheeling, West Va., and as Nursing Field Representative for Kentucky, West Virginia, and Indiana.

Dr. Adelaide Ross Smith has been appointed lecturer in Industrial Hygiene. Dr. Smith graduated from Wellesley in 1916, and from Cornell Medical School in 1921. Her interneship was at Bellevue Hospital. Her industrial and clinical experience has included service with the New York Telephone Company, Life Extension Institute, Cornell Clinic, Physician to the Bureau of Women in Industry, New York State Department of Labor.

Dr. Elizabeth Kilpatrick has been appointed assistant to Dr. Lambert in Mental Hygiene, and is to have particular supervision of the field work. Dr. Kilpatrick graduated from the Medical School at Dalhousie in 1915 and also from the Long Island College Medical School, 1925. Her interne work includes experience at the New England Hospital for Women and Children, Boston Women's Hospital, Detroit. She has served as Assistant Physician at Northampton State Hospital, Massachusetts, Nova Scotia Hospital, Halifax, Boston Psychopathic Hospital. She is at present Assistant Physician at Bloomingdale Hospital, White Plains, N. Y.

Recent Appointments in Nursing Education

Miss Ruth Sleeper (B.S. 1926) as instructor, School of Nursing, Western Reserve University, Cleveland, Ohio.

Miss Cornelia Erskine (1912-1913) as instructor, City Hospital, San Francisco, Calif.

Miss Deborah MacLurg (B.S. 1927) as instructor, School of Nursing, University of Minnesota, Minneapolis, Minn.

Miss Adelaide Mayo (A.M. 1926) as member of State Board of Nurse Examiners, Department of Education, Albany, N. Y.

Miss Helen Zurawski (1918-21) as head nurse, Communicable Disease Division, New Haven Hospital, New Haven, Conn.

Miss Daisy Perrine (B.S. 1927) as

supervisory nurse, Children's Communicable Disease Center, New Haven, Conn.

Mrs. Mary S. Phelan (A.M. 1927) as school nurse, Middlesex County Vocational School, New Brunswick, N. J

Miss Ruth Heintzelman (B.S. 1927) as clinic nurse for Crippled Children, Department of Public Welfare, Harrisburg, Pa.

Miss Alice M. Morse (B.S. 1927) as superintendent of Hospital and Principal, School of Nursing, Rutherford Hospital, Murfreesboro, Tenn.

Miss Maud Holman (B.S. 1924) as health educator, Lewiston Normal School, Lewiston, Idaho.

Miss Margaret McAlpine (1926-27) as staff nurse, Marion County Health Demonstration, Salem, Oregon.

Miss Julia Wilkinson (A.M. 1923) as director, North Shore Public Health Nursing Association, Flushing, N. Y.

Miss Elizabeth Culver (1922-23) as director, Visiting Nurse Association, Wilkes-Barre, Pa.

Miss Mae Brown (B.S. 1927) as field supervisor, Visiting Nurse Association, Grand Rapids, Mich.

Miss Inez Cadel (1923-24) as supervisor of Child Hygiene, Bellevue-Yorkville Health Demonstration, New York City.

Miss Margaret Reid (1926-27) as nursing Field Representative for Red Cross in Indiana.

Miss Gertrude Armstrong has been appointed director of nursing and health of the Bowling Green Neighborhood House.

At the request of the Visiting Nurse Association of Syracuse, New York, the Board of Health released Miss Cathleen Cooper who had been educational director on their staff since graduating from Teachers College in 1926, to accept the directorship of the Visiting Nurse Association. This opening offers Miss Cooper an interesting opportunity to reorganize and develop the Visiting Nurse Service so that it may coöperate more fully in the Public Health development that is being carried forward under the direction of the Syracuse Health Demonstration.

Within the last few months, there have been several deaths among our alumnae, which will be keenly felt in the profession at large. Miss Flora Shaw (1903-06), one of the pioneer students of the old Hospital Economics course and recognized as one of the foremost leaders in Nursing Education in Canada, did her most conspicuous piece of work in building up the course for graduate nurses in McGill University, Montreal. Miss Lisle Freligh (1913 and 1923-24) who had done a year's work beyond her Master's degree postponed her study for the Ph.D. in order to see how far she could apply experimental and scientific methods in working out some of the problems of a big municipal hospital in San Francisco. She had already achieved quite remarkable results but probably sacrificed her health to her own zeal and devotion. Miss Margaret Tupper was a valued member of the Rockefeller Foundation Staff in Europe and was engaged in survey work for the Nursing Division, in Poland and in several other countries. Miss Harriet Leete (1912-13) was identified for many years with Child Welfare work, as Superintendent of the Babies Hospital in Cleveland, as field director of the American Child Hygiene Association and later as Superintendent of the Wavecrest Convalescent Home in Far Rockaway for the Brooklyn Children's Aid Society.

PHILOSOPHY OF EDUCATION

Professor William H. Kilpatrick addressed the Missouri State Teachers Association in St. Louis on November 10 and attended the Teachers College dinner held in connection with the meeting. On November 12 he spoke in Milwaukee under the auspices of the Milwaukee Teachers Association on "The World Situation and Its Demands on Education."

Dr. Kilpatrick spent November 22 in Pennsylvania, speaking in the morning to the teachers of Lebanon, and in the afternoon to the teachers of Harrisburg. He was the guest of the Dauphin County Columbia Club at dinner in Harrisburg that evening.

Professor Kilpatrick has recently accepted membership on the American National Council of the Institute of Pacific Relations and is serving as Chairman of the Education Committee.

Dr. Kilpatrick's book, *Education for a Changing Civilization*, has recently been published in Japanese. The translation was made by Mr. M. Nishimoto, a former student in Teachers College now connected with the Tezukayama Gakuin at Osaka, Japan.

RURAL EDUCATION

Thursday evening, February 23, is the date selected for the most outstanding and significant event ever chronicled by Columbia University in the interest of country life. This will take the form of a big *COUNTRY LIFE DINNER* to be held in the auditorium of International House at which the twenty-year anniversary of the Roosevelt Commission on Country Life, the ten-year anniversary of the American Country Life Association, and also the ten-year anniversary of the Department of Rural Education in Teachers College will all be celebrated. Plans are being laid for the entertainment of about 500 guests at this dinner including not only faculty members and students of Teachers College and Columbia University but social workers and business leaders of New York City and outstanding educators, both urban and rural, who will be passing through the city at this time en route to Boston for the annual meeting of the Department of Superintendence. In addition to these a special financial group including representatives of Foundations and wealthy philanthropists will be included as guests of the University by special invitation from President Nicholas Murray Butler.

The underlying purpose of this gathering is twofold: *first*, to develop a more wide-spread interest and understanding of rural-life needs among the various faculties of the University and other leaders in New York City; and *second* to enlist the financial support of the Foundations and other sources of revenue in the country-life projects now being contemplated by both the University and the American Country Life Association.

On the part of Columbia University the outstanding matter for consideration in this connection is the founding of an *International Institute of Country Life* as discussed in President Butler's *Annual Report* for 1923. The special committee of faculty and financiers having this matter in charge, which has been meeting in conference with the President from time to time during the past three years, will attend the dinner as a group.

President Butler will act as presiding officer for the program of the evening

and the chief speakers will be Senator Arthur Capper of Kansas who will present the present economic situation in agriculture, and President Kenyon L. Butterfield of Michigan who will discuss the possible contributions of Columbia University and of the American Country Life Association toward the fuller development of country life. In addition to these two addresses brief speeches will be made by Henry Israel on the objectives and work of the American Country Life Association and by Ernest Burnham of Kalamazoo, Michigan, on the contribution of Teachers College to the special field of rural education. Professor Liberty Hyde Bailey of Cornell University, early chairman of the Roosevelt Commission on Country Life has been invited as a special guest of honor and several representatives of foreign countries will be present and conclude the program with two-minute remarks upon the meaning of the proposed developments to their respective lands.

Tickets for the dinner may be ordered by mail at $2.50 per plate from either O. S. Morgan, Department of Agriculture, Columbia University, or Mabel Carney, Teachers College. Students in residence will be admitted to the balcony of the Auditorium to hear the program by special ticket at 50 cents each.

TEXTILES AND CLOTHING

Miss Lillian H. Locke spoke before the Association to Promote Proper Housing for girls at its annual luncheon held at the Hotel Pennsylvania on November 21, on "Clothing Expenditures for the Working Girl in New York City."

Mrs. Evelyn Tobey attended the Maine Teachers Association annual meeting held in Portland October 27-28. The subjects of the addresses given befor the Home Economics division were "Personality and Clothes," and "Modern Trends in the Teaching of Clothing."

Mrs. Tobey will address the students of the State Normal School at Farmington, Maine, on December 2. Her subject will be "The Opportunity of the Home Economics Teacher for Character Training."

VOCATIONAL GUIDANCE

Professor Harry D. Kitson has recently given addresses on the subject of Vocational Guidance before the New York State Teachers Association, Syracuse, October 28; the Child Study Association of America, New York City, November 2; the Nebraska State Teachers Association, Omaha, November 24; and at Lincoln, November 25; and the Philadelphia Parent's Council, November 15.

The Teachers College Branch of the National Vocational Guidance Association met on November 7 and elected as officers for the year: President, Mr. Ben B. Schmidt; Secretary-Treasurer, Miss Sarah Louise Proctor.

A number of the members of this Branch attended a dinner meeting on November 10 as guests of the New York City Association. Several other interesting meetings are planned for the year.

ALUMNI ACTIVITIES

TEACHERS COLLEGE ALUMNI ASSOCIATION OFFICERS

President: Mr. Frank Pickell, Superintendent of Schools, Montclair, N. J.
First Vice-President: Dr. Fannie W. Dunn, Assistant Professor of Education, Teachers College.
Second Vice-President: Dr. Bessie Lee Gamerill, Associate Professor of Elementary Education, Yale University, New Haven, Conn.
Recording Secretary: Miss Mary Lewis, Teacher in Horace Mann School, Teachers College, New York City.
Corresponding Secretary: Miss Katherine I. Sherwin, Executive Secretary of Student Organizations, Teachers College.
Treasurer: Dr. R. G. Reynolds, Director, Bureau of Educational Service, Teachers College.
Members-at-Large: Mr. Frank Morey, Supervising Principal of Schools, Camp Hill, Pa.
Miss Effie Taylor, Professor of Psychiatric Nursing, School of Nursing, Yale University, New Haven, Conn.
Miss Marion Sheridan, 711 Orange Street, New Haven, Conn.
Alumni Trustee:
Miss Mercy J. Hayes, 301 American State Bank Building, Detroit, Mich.
Alumni Office: Russell Hall, Teachers College, 525 West 120th Street, New York City.

Address all communications to Robert K. Speer,
Field Secretary, Teachers College, New York City.

SECRETARY-TREASURERS OF TEACHERS COLLEGE CLUBS

Africa—South Africa Club
Dr. E. G. Malherbe
University of Cape Town
Cape Town, South Africa

Alabama—State Club
Miss Agnes Harris
Auburn, Ala.

Arkansas—State Club
Mr. H. G. Hotz
University of Arkansas
Fayetteville, Ark.

California—Southern Club
Miss Lela W. Aultman
6811 Leland Way
Hollywood, Calif.

CHINA—EAST CHINA CLUB
Mrs. Nita M. Stallings
Soochow, Ku, China

CONNECTICUT—NEW HAVEN CLUB
Miss Frances Terrill
100 Whalley Avenue
New Haven, Conn.

CONNECTICUT—STATE CLUB
Mrs. A. W. Jennings
1172 Chapel Street
New Haven, Conn.

GEORGIA—ATLANTA CLUB
Miss Isabel Dew
Head, Mathematics Department
Fulton High School
Atlanta, Ga.

GEORGIA—STATE CLUB
Miss Leila Bunce
Director, Home Economics
Fulton High School
Atlanta, Ga.

INDIANA—SOUTH BEND CLUB
Miss Mamie E. Kerner
115 North William Street
South Bend, Ind.

INDIANA—STATE CLUB
Miss McBeth
Terre Haute, Ind.

KANSAS-WICHITA CLUB
Miss Christina Rosendale
Wichita High School
Wichita, Kan.

LOUISIANA—STATE CLUB
Prof. Homer L. Garrett
Louisiana State University
Baton Rouge, La.

MAINE—STATE CLUB
Mr. Frank D. Rowe
Supt. of Schools
Warren, Me.

MARYLAND—STATE CLUB
Miss Lucetta M. Sisk
Principal, High School
Randallstown, Md.

MICHIGAN—ANN ARBOR CLUB
Secretary
Miss Ethyl M. Neelands
Couzens Hall
Ann Arbor, Mich.

Treasurer
Miss Edith Bader
548 Thompson Street
Ann Arbor, Mich.

MICHIGAN—BATTLE CREEK CLUB
Mrs. D. R. Dudley
Asst. Superintendent of Schools
Battle Creek, Mich.

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Recording Secretary
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Northern High School
Detroit, Mich.

Treasurer
Miss Jessie Wedin
Detroit, Mich.

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Mrs. Mabel Hutchings Bellows
Kensington School
Kensington and Curve Sts.
Grand Rapids, Mich.

MICHIGAN — NORTHERN MICHIGAN CLUB
Mr. Sidney Herring
401 Front Street
Marquette, Mich.

MINNESOTA—STATE CLUB
Miss Elizabeth Sadley
Northrop Collegiate School
Minneapolis, Minn.

MISSOURI—KANSAS CITY CLUB
Miss Madeleine Farley
805 East 30th St.
Kansas City, Mo.

MISSOURI—ST. LOUIS CLUB
Mr. H. P. Stellwagen
Board of Education
St. Louis, Mo.

MISSOURI—STATE CLUB
Miss Margaret Gartenbach
St. Louis, Mo.

NEW YORK—BUFFALO CLUB
Miss Agnes McCarthy
Technical High School
Buffalo, N. Y.

NORTH CAROLINA—STATE CLUB
Mr. L. R. Johnson
111 Steele Street
High Point, N. C.

OHIO—AKRON CLUB
Miss Clara Barker
614 West Market Street
Akron, O.

OHIO—ATHENS CLUB
Mrs. E. B. Smith
University of Ohio
Athens, O.

OHIO—CINCINNATI CLUB
Mr. E. D. Roberts
Denton Building
Cincinnati, O.

OHIO—CLEVELAND CLUB
Secretary
Miss Liva Biszantz
11311 Clifton Blvd.
Cleveland, O.
Treasurer
Miss Mary C. Frederick
Mill School
Cleveland, O.

OHIO—KENT CLUB
Miss Isabelle Hazen
Franklin Apartments
Kent, O.

OHIO—TOLEDO CLUB
Miss Grace Gordon
Riverside School
Toledo, O.

OKLAHOMA—STATE CLUB
Miss Lucy Helen Meacham
Director of Grades
Oklahoma City, Okla.

PENNSYLVANIA—HARRISBURG CLUB
Miss Helen Krall
221 S. 13th Street
Harrisburg, Pa.

PENNSYLVANIA—PHILADELPHIA CLUB
Acting Secretary
Mrs. Ida P. Statler, President
130 Price Street
West Chester, Pa.

PHILIPPINE ISLANDS
Mr. Sabino Taburnor
Bureau of Education
Division of Bataugas, P. I.

TEXAS—STATE CLUB
Miss Evalina Harrington
Primary Supervisor, Public Schools
School Administration Building
El Paso, Texas

VERMONT—STATE CLUB
Miss Mary B. Sullivan
Normal School
Castleton, Vt.

VIRGINIA—STATE CLUB
Mr. C. B. Givens
4010 West Street
Richmond, Va.

WEST VIRGINIA—STATE CLUB
Miss Wilma C. Spears
Marshall College
Huntington, W. Va.

WISCONSIN—STATE CLUB
Mr. H. W. Peterson
1049 39th Street
Milwaukee, Wis.

PRESIDENTS OF CLASSES

CLASS OF 1916
Miss Mildred Memory
1 Kermit Road
Maplewood, N. J.

CLASS OF 1917
Mrs. Hazen Hoyt
3558 65th Street
Woodside, L. I.

CLASS OF 1918
Mrs. Louise Holbrook Baldwin
1669 Columbia Road
Washington, D. C.

CLASS OF 1919
Mrs. Joseph M. Couse
408 Asbury Park Avenue
Asbury Park, N. J.

CLASS OF 1920
Miss Ruth Taft
294 Macon Street
Brooklyn, N. Y.

CLASS OF 1921
Miss Margaret Briggs
1505 Jefferson Avenue
Scranton, Pa.

CLASS OF 1922
Miss Eva Wagner
Lincoln School
425 West 123rd Street
New York City

CLASS OF 1923
Miss Grace Ely
6 Kendall Green
Washington, D. C.

CLASS OF 1924
Miss Sallie Serson
34th and Chestnut Streets
Philadelphia, Pa.

CLASS OF 1925
Miss Helen Warren
The Garrison Forest School
Green Spring Valley
Garrison, Md.

CLASS OF 1926
Miss Yvonne Fassler
542 Second Avenue
Pelham, N. Y.

ALUMNI HOME-COMING CELEBRATION CANCELLED

The Alumni Home-Coming Celebration which was announced for February 24 and 25 has been cancelled. A National Education Conference will be held in Teachers College, at which time the inauguration of Dean William F. Russell will take place. The Alumni Association will coöperate with the committee in charge of the inauguration and the conference.

TEACHERS COLLEGE CLUB OF DETROIT, MICHIGAN

Nearly fifty former students of Teachers College were present at the annual Columbia Breakfast, at Hotel Belcrest, Detroit, Mich., on Friday morning, October 28. President Robert Magee, of Detroit Teachers College, introduced the speaker, Miss Mercy J. Hayes, our alumni trustee. Miss Hayes gave an interesting resumé of important events in the recent history of Alma Mater. The nominating committee's report was unanimously adopted. The following officers were elected: President, Evelyn Hubbard; Secretary, Zaide I. Voorheis; Treasurer, Jessie Wedin.

TEACHERS COLLEGE CLUB OF INDIANA

The Teachers College alumni dinner at Indianapolis, Ind., on Friday evening, Oct. 21, was spirited and enthusiastic. There were more than sixty present. Miss McCarthy was chairman of the committee on arrangements, Miss Drake was toastmaster, and Mrs. Sies was also at the speakers' table. Dr. Thomas H. Briggs was the speaker of the evening.

The new officers were elected as follows: President, Miss Flora Drake; Vice-president, Miss Hamilton of Gary, Ind.; and Secretary, Miss McBeth of Terre Haute.

TEACHERS COLLEGE CLUB OF WICHITA, KANSAS

The second meeting of the Teachers College Club of Wichita, Kan., was held Friday evening, November 4, at the Hotel Shirkmere, with eighty-seven alumni members in attendance. Doctor James F. Hosic, who was speaker at the college and high school departmental sections of the Wichita division of the Kansas State Teachers Association, was guest of honor. Dr. Hosic brought news of well-known Teachers College faculty folk, their recent accomplishments and plans for the future, and he gave a summary of his last year's trip to South America.

The first meeting of the Wichita Club was held in April and the following officers were elected: President, Superintendent L. W. Mayberry; Vice President, Marguerite Bliss; and Secretary-Treasurer, Christina Rosendale.

ALUMNI NOTES

Ruth E. Cargo (A.M. 1927) is head of the household arts department and dietitian for the boarding club at Adrian College, Adrian, Mich.

M. Theresa Peters (A.M. 1927) is director of programs of physical education and health education, State Normal School, Bellingham, Wash.

Gertrude Burns (A.M. 1926) is instructor in education and supervisor of student teaching in the nursery school, department of nursery-kindergarten-primary education, Western Reserve University, Cleveland, O.

Marion Martin (B.S. 1926) is in the department of physical education, University of Washington, Seattle, Wash.

L. Janette Wirt (A.M. 1926) is director of physical education for women, University of Idaho, Moscow, Ida.

Ilene H. Compton (A.M. 1926) is dean of women and assistant in social science, Washington State Normal School, Ellensburg, Wash.

Maude E. Ramsdell (B.S. 1927) has fifth grade critic work in the elementary school, Michigan State Teachers College, Ypsilanti, Mich.

Elinor M. Brown (A.M. 1927) is director of the nursery school, which has been opened this year by the Castle Kindergarten, Fernhurst Homestead, Honolulu, T. H.

Mary Theresa Scudder (A.M. 1926) dean of women at Winthrop College, Rock Hill, S. C., has been appointed to a full professorship in sociology. She is offering as a senior elective a discussion course in the "Social Problems of the Family."

Elizabeth H. Martin (now Mrs. Harold Ferris) (B.A. 1924) taught clothing, fine arts, and interior decoration for two years at Northfield Seminary, Northfield, Mass., and was head of one of the dormitories the second year. Last year she taught clothing and foods in grades at Yonkers, N. Y.

Hazel E. Jones (B.S. 1926) has returned for her second year as teacher of individual gymnastics and health in the physical education department of the Central High School, Kalamazoo, Mich.

Elizabeth J. Bowen (A.M. 1927) is instructor in clothing in the home economics department of the San Jose Senior High School, San Jose, Calif.

Elizabeth A. Lathrop (A.M. 1927) has gone to the University of Akron, Akron, O., as instructor in clothing in the department of home economics there.

Amanda Jacobson (B.S. 1920, A.M. 1923) went to Paris to study in January, 1923. She took work in interior architecture and decoration in the Paris

ateliers of the New York School of Fine and Applied Art. In September, 1923, she went to the Iowa State College to take charge of the undergraduate work in house planning and graduate work in interior decoration in the art department of the home economics division. In September, 1927, she accepted a position as head of the art department at the Junior College, San Bernardino, Calif.

Lena E. McGucken (B.S. 1926) is supervisor of home economics in the Herkimer public schools, Herkimer, N. Y.

Mary E. Fenner (B.S. 1926) has returned to Sag Harbor, L. I., for the second year as supervisor of art.

William E. Stark (student 1926-27) is dean of the college, Hampton Institute, Hampton, Va.

Nina E. Baumgardner (A.M. 1924) is principal of the primary department of the State Teachers College, Mankato, Minn.

J. G. Manzer (student 1925-26) is principal of the high school, St. Andrews, N. B., Canada.

Margaret Lane Dozier (B.S. 1923) has resigned as instructor in home economics at Pennsylvania State College and is now assistant professor of home economics at the University of Alabama, University, Ala.

G. Derwood Baker (A.M. 1926), formerly on the staff of the John Burroughs School, St. Louis, Mo., is now principal of Langley Junior High School, Washington, D. C.

Edna J. Orr (A.M. 1925) taught a course in "Feeding the Family" at the University of Hawaii in the summer session of 1927. She is now director of home economics at the Territorial Normal and Training School, Honolulu, T. H.—a department with six teachers.

Lela J. Bennett (M.S. 1927) is teaching in the foods and nutrition department at Iowa State College, Ames, Ia.

Philomena Supper (A.M. 1926) is associate in the health and physical education department, State Teachers College, Farmville, Va.

Emma Woodman (B.S. 1924) is supervisor of art in the Inglewood city schools, Inglewood, Calif.

Winifred Julian (A.M. 1927) is instructor in the French department at Washington State College, Pullman, Wash.

V. H. Barker (A.M. 1927) is assistant superintendent of schools of the Canal Zone, Balboa Heights, Canal Zone.

Ruth A. Harding (A.M. 1925) is acting director of the department of textiles and clothing, Teachers College of Indianapolis, Indianapolis, Ind.

Rhandena A. Armstrong (A.M. 1927) is director of Home Information Center, Boston, Mass., one of the centers of the American Homemakers, Inc.

Mary Heitsch (B.S. 1921, A.M. 1927) is associate professor of art at the North Texas State Teachers College, Denton, Tex.

Dorothy Koehring (A.M. 1922) is instructor in kindergarten at Illinois State Normal University, Normal, Ill.

Marguerite Stem (A.M. 1925) since September, 1925, has been assistant supervisor of special classes in the public schools of Grand Rapids, Mich.

Myrtle Carnes (B.S. 1925) is kindergarten-primary supervisor, Stockton, Calif. She writes: "This is the first supervision here. My work is with seventy-five teachers, whose experience range from one to fifty years, with training from eighth-grade graduation to normal school (three or four with a degree). We are using the new term 'Teacher

Adviser' and visiting teachers upon invitation only. So far we can't begin to answer all the calls. A demonstration school and research department is our goal."

Zula B. Balleu (A.M. 1926) is dean of women in a State Teachers College, Silver City, N. M.

Stella Bradfield (A.M. 1923) is teaching general and educational psychology, Winthrop College, Rock Hill, S. C.

Orwin Bradford Griffin (Ph.D. 1927) since 1920 has been head of the English department, Wilby High School, Waterbury, Conn.; since 1923, submaster. He was on leave of absence in 1926-27 and served as part-time instructor in history of education, Teachers College, Columbia University. During the Summer Session 1927 he was professional lecturer in history of education at the College of Education, University of Minnesota, Minneapolis, Minn. His forthcoming book, published by the Bureau of Publications, Teachers College, is entitled *The Evolution of the Connecticut State School System with Special Reference to the Emergence of the High School.*

Lena Walmsley (A.M. 1927) is in charge of the physical education department, Bates College, Lewiston, Me.

Florence M. Sublette (A.M. 1927) is head of the department of public school music, Kent State Normal College, Kent, O.

Margaret Fletcher (A.M. 1927) is the first dean of women to be appointed at New Paltz State Normal School, New Paltz, N. Y.

Vera Duncan (A.M. 1927) is a critic teacher in the Geneseo Normal School, Geneseo, N. Y.

Otto T. Hamilton (Ph.D. 1927) is doing university extension work in Indiana. He is teaching graduate classes in grounds, buildings, and equipment; also records and reports. In addition to that he is teaching one class in Buckingham's Research and one in secondary education. His headquarters are in Gary and his work is both there and through northern Indiana.

Roy P. Wisehart (A.M. 1926) in September, 1927, was appointed state superintendent of public instruction in Indiana.

Ethel C. Sawyer (student 1925-26) has purchased the Riverside Business College, a business college of some twenty-five years record, Riverside, Calif. It is located near the historic Mission Inn and draws students from all over the country.

Harriet Brackney (A.M. 1925) since September has been connected with the education department, New York State College, Geneseo, N. Y.

Louise Farwell (A.M. 1923) is in the supervision department at the National Kindergarten College, Evanston, Ill., in charge of research in connection with the training of student teachers.

A. R. Mead (Ph.D. 1917) who was in 1925 visiting professor of education in the department of normal school education at Teachers College, Columbia University, is now on leave of absence for the current year from Ohio Wesleyan University, Delaware, O., on account of illness. He is making satisfactory progress in recovery.

Gates Silent Reading Tests

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Type 3. Reading of Paragraphs of Directions.

Each paragraph gives a direction to be executed by a simple mark. To execute the direction, however, the pupil must grasp the whole paragraph. The paragraphs increase in length and complexity.

What each pupil's special strengths and deficiencies are is indicated by comparing the results of the three tests. The Manual of Directions illustrates each type of difficulty and gives full directions for remedial instruction. The results give an almost automatic diagnosis of outstanding difficulties and indicate very definitely the type of remedial treatment most needed.

GATES READING TESTS GRADES 3 TO 8

The team comprises four tests—

Type A. Reading to Appreciate the General Significance of a Paragraph.

These tests measure speed and accuracy in getting the general drift or significance of a passage.

Type B. Reading to Predict the Outcome of Given Events.

This test requires more "reading between the lines," a deeper grasp of the situation depicted. Comprehension is tested by ability to tell which of several things is "most likely to come next."

Type C. Reading to Understand Precise Directions.

This test requires both a very full and a very exact understanding of a paragraph. It measures ability to do very exacting reading.

Type D. Reading to Note Details.

Test D measures ability to analyze and identify significant details in a passage.

When the scores for the four tests of this team are combined (by a simple technique) an excellent measure of general reading skill is provided. The Manual of Directions gives concrete pictures of the different types or patterns of abilities and disabilities, explains how the test results indicate each type, and present in detail the proper remedial procedures.

All of these tests are group tests, and are easily administered. All are based upon a suitable vocabulary, determined by extensive studies of words. The comprehension tests are composed of attractive materials written by especially trained writers and selected experimentally. The scoring is exceedingly rapid and mechanical. Norms of average attainments and of highest attainments of average New York City pupils for each age and grade.

THE COST OF THE TESTS

Primary Team of 3 tests: $6.00 per 100 (single tests, $3.00 per 100). Teachers Manual, 40 cents. Grades 3 to 8 Team of 4 tests: $8.00 per 100 (single tests, $3.00 per 100). Teachers Manual, 25 cents.

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